# FLOOD INSURANCE STUDY

## FEDERAL EMERGENCY MANAGEMENT AGENCY

**VOLUME 2 OF 5**

# VENTURA COUNTY, CALIFORNIA

### AND INCORPORATED AREAS

| COMMUNITY NAME | COMMUNITY NUMBER |
|---|---|
| CAMARILLO, CITY OF | 065020 |
| FILLMORE, CITY OF | 060415 |
| MOORPARK, CITY OF | 060712 |
| OJAI, CITY OF | 060416 |
| OXNARD, CITY OF | 060417 |
| PORT HUENEME, CITY OF | 065051 |
| SAN BUENAVENTURA, CITY OF | 060419 |
| SANTA PAULA, CITY OF | 060420 |
| SIM VALLEY, CITY OF | 060421 |
| THOUSAND OAKS, CITY OF | 060422 |
| VENTURA COUNTY, UNINCORPORATED AREAS | 060413 |

FEMA

**PRELIMINARY**

**09/30/2016**

**REVISED:**

FLOOD INSURANCE STUDY NUMBER
06111CV002D

Version Number 2.3.3.3

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**Published Separately**

Flood Insurance Rate Map (FIRM)

## SECTION 5.0 – ENGINEERING METHODS

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2% annual chance, respectively, of being equaled or exceeded during any year.

Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

### 5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 13. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 10. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 7 for selected flooding sources. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 11. (Coastal stillwater elevations are discussed in Section 5.3 and shown in Table 17.) Stream gage information is provided in Table 12.

**Table 10: Summary of Discharges**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Adams Canyon | At Telegraph Road | 8.40 | 1,200 | * | 3,100 | 4,200 | 7,400 |
| Alamos Canyon | At Southern Pacific Railroad | 6.00 | * | * | * | 3,800 | * |
| Arroyo Las Posas | Downstream of confluence of Peach Hill Wash | 143.35 | 9,390 | * | 19,460 | 25,100 | 41,500 |
| Arroyo Las Posas | Upstream of confluence of Peach Hill Wash | 117.40 | 8,260 | * | 17,120 | 22,090 | 36,520 |
| Arroyo Santa Rosa | Upstream of confluence with Arroyo Conejo | 14.35 | 1,970 | * | 3,770 | 4,740 | 7,510 |
| Arroyo Santa Rosa | At confluence of Tributary to Arroyo Santa Rosa | 13.04 | 1,980 | * | 3,800 | 4,770 | 7,510 |
| Arroyo Santa Rosa | At East Las Posas Road | 8.33 | 1,861 | * | 3,561 | 4,473 | 7,099 |
| Arroyo Santa Rosa | At Santa Rosa Road | 8.61 | 1,770 | * | 2,610 | 2,830 | 3,650 |
| Arroyo Santa Rosa | Downstream of Duval Road | 9.29 | 1,750 | * | 2,580 | 2,790 | 3,580 |
| Arroyo Simi | Downstream of confluence with Happy Camp Canyon Creek | 113.20 | 8,300 | * | 17,200 | 22,190 | 36,670 |
| Arroyo Simi | Downstream of Alamos Canyon | 88.70 | 5,670 | * | 13,060 | 17,460 | 31,200 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Arroyo Simi | Downstream of Brea Canyon | 80.20 | 5,570 | * | 12,820 | 17,140 | 30,530 |
| Arroyo Simi | Downstream of North Simi Canyon | 69.50 | 5,600 | * | 12,890 | 17,240 | 30,810 |
| Arroyo Simi | Upstream of Bus Canyon Drain | 61.50 | 5,110 | * | 11,950 | 15,900 | 28,580 |
| Arroyo Simi | Upstream of Tapo Canyon Channel | 32.30 | 4,440 | * | 10,220 | 13,670 | 24,420 |
| Arroyo Simi | Downstream of Meier Canyon | 30.90 | 4,460 | * | 10,270 | 13,730 | 24,540 |
| Arroyo Simi | Upstream of Las Llajas Canyon Channel | 10.40 | 2,410 | * | 5,540 | 7,400 | 13,230 |
| Arroyo Simi | Upstream of White Oak Canyon | 2.70 | 1,000 | * | 2,300 | 3,080 | 5,500 |
| Arundell Barranca | At U.S. Highway 101 | 9.24 | 1,360 | * | 4,420 | 6,200 | 11,500 |
| Barlow Barranca | At U.S. Highway 101 | 2.13 | 380 | * | 1,250 | 1,700 | 3,200 |
| Beardsley Wash | At Ventura Freeway | 15.00 | 2,100[1] | * | 4,600[1] | 6,200[1] | 11,000[1] |
| Beardsley Wash | Upstream of Wright Road | 14.00 | 2,300 | * | 5,000 | 6,800 | 12,000 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Bell Canyon Creek | Upstream of Ventura/Los Angeles County boundary (approximately 1,860 feet downstream of East Bell Canyon Road) | 5.13 | 700 | * | 2,340 | 3,300 | 6,200 |
| Bell Canyon Creek | Upstream of elevation 1,128 feet (approximately 2,150 feet downstream of North Buckskin Road) | 3.32 | 490 | * | 1,650 | 2,300 | 4,300 |
| Brea Canyon | At confluence with Arroyo Simi | 2.10 | * | * | * | 1,250 | * |
| Brown Barranca | At confluence with Santa Clara River | 3.49 | 600 | * | 1,930 | 2,660 | 5,000 |
| Brown Barranca | Upstream of Telegraph Road | 1.81 | 325 | * | 1,050 | 1,450 | 2,700 |
| Bus Canyon Drain | At confluence with Arroyo Simi | 5.10 | * | * | * | 3,050 | * |
| Bus Canyon Drain | Above confluence of Bus Canyon Drain Tributary | 3.70 | * | * | * | 2,800 | * |
| Bus Canyon Drain Tributary | At First Street | 1.10 | * | * | * | 1,300 | * |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Bus Canyon Drain Tributary | At Fitzgerald Road | 0.80 | * | * | * | 1,050 | * |
| Calleguas Creek | At Highway 1 | 262.00 | 12,230 | * | 28,140 | 37,630 | 67,240 |
| Calleguas Creek | Downstream of confluence of Conejo Creek | 248.30 | 16,000 | * | 30,610 | 38,460 | 61,030 |
| Calleguas Creek | Upstream of Conejo Creek & Lewis Drain | 168.70 | 10,390 | * | 21,520 | 27,770 | 45,900 |
| Calleguas Creek | At Seminary Road | 164.90 | 10,350 | * | 21,450 | 27,680 | 45,760 |
| Camarillo Hills Drain | Upstream of confluence with Revolon Slough | 8.1 | 1,720 | * | 3,564 | 3,564 | 7,620 |
| Camarillo Hills Drain | Upstream of confluence of Las Posas Estates Drain[2] | 7.5 | 1,670 | * | 3,336 | 3,336 | 7,440 |
| Camarillo Hills Drain | Downstream of confluence of Crestview Drain | 5.55 | 1,780 | * | 3,640 | 4,790 | 7,920 |
| Camarillo Hills Drain | At Ventura Freeway | * | * | * | * | 3,220 | * |
| Camarillo Hills Drain | At Lantana Street | * | * | * | * | 2,226 | * |
| Camarillo Hills Drain | At Dunnigan Street | * | * | * | * | 842 | * |
| Camarillo Hills Drain | Downstream of Ponderosa Drive | * | * | * | * | 737 | * |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Conejo Creek | At confluence with Calleguas Creek | 77.60 | 9,300 | * | 17,800 | 22,300 | 35,500 |
| Conejo Creek | At Highway 101 bridge | 71.90 | 9,560 | * | 18,300 | 22,000 | 36,500 |
| Conejo Creek | Downstream of confluence of Arroyo Conejo | 60.00 | 9,660 | * | 18,500 | 23,200 | 36,900 |
| Coyote Creek | Upstream of confluence with Ventura River | 41.30 | 500 | * | 1,450 | 2,500 | 3,450 |
| Coyote Creek | Downstream of Casitas Dam | 38.70 | 100 | * | 300 | 2,100 | 3,040 |
| Doris Avenue Drain | At Patterson Road | 0.40 | 50 | * | 150 | 250 | 750 |
| Dry Canyon Drain | At Heywood Street | 3.70 | * | * | * | 3,350 | * |
| Dry Canyon Drain | At Southern Pacific Railroad | 2.90 | * | * | * | 2,400 | * |
| Dry Canyon Drain | At Highway 118/Simi Valley freeway | 2.20 | * | * | * | 1,750 | * |
| Edgemore Drain | Downstream of Getman Street | * | * | * | * | 451 | * |
| Edgemore Drain | Downstream of Aileen Street | * | * | * | * | 366 | * |
| El Rio Drain | At confluence with Santa Clara River | 1.70 | 90 | * | 220 | 300 | 800 |
| El Rio Drain | At Vineyard Avenue | 1.60 | 90 | * | 190 | 250 | 800 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| El Rio Drain | Downstream of Ventura Freeway | 1.40 | 90 | * | 160 | 200 | 760 |
| El Rio Drain | Upstream of Ventura Freeway | 0.87 | 170 | * | 450 | 580 | 1,100 |
| El Rio Drain | Downstream of Walnut Drive | 0.26 | 70 | * | 170 | 220 | 400 |
| Erringer Drain | Upstream of confluence with Arroyo Simi | 1.40 | * | * | * | 1,420 | * |
| Erringer Drain | At Arcane Street | 1.30 | * | * | * | 1,410 | * |
| Erringer Drain | At Fitzgerald Street | 1.20 | * | * | * | 1,410 | * |
| Fagan Canyon | At Southern Pacific Railroad tracks | 3.40 | 800 | * | 2,100 | 2,800 | 5,200 |
| Fox Canyon Storm Drain | At confluence with Steward Canyon | 2.30 | 1,400 | * | 2,300 | 2,800 | 4,000 |
| Franklin Barranca | At confluence with Santa Clara River | 4.96 | 700 | * | 2,380 | 3,350 | 6,200 |
| Franklin Barranca | Upstream of Santa Paula Freeway | 1.47 | 250 | * | 820 | 1,140 | 2,100 |
| Happy Valley Drain | At Cruzero Street | 0.59 | 130 | * | 240 | 360 | 510 |
| Harmon Barranca | At confluence with Santa Clara River | 5.28 | 700 | * | 2,320 | 3,270 | 6,100 |
| Harmon Barranca | Upstream of Telephone Road | 4.59 | 610 | * | 2,070 | 2,900 | 5,400 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Hummingbird Creek | At Alscot Avenue | 1.90 | * | * | * | 1,790 | * |
| Hummingbird Creek | At Kyehner Drive | 1.80 | * | * | * | 1,570 | * |
| Hummingbird Creek | At Freeway | 1.60 | * | * | * | 1,480 | * |
| J Street Drain | At mouth | 1.90 | 200 | * | 550 | 900 | 3,000 |
| J Street Drain | At Pleasant Valley Road | 1.70 | 200 | * | 500 | 850 | 2,900 |
| J Street Drain | At Bard Road | 1.50 | 150 | * | 450 | 750 | 2,450 |
| J Street Drain | At Redwood Street | 0.90 | 100 | * | 300 | 450 | 1,500 |
| Lang Creek | Upstream of confluence of Arroyo Conejo | 6.80 | 1,390 | * | 2,670 | 3,350 | 5,320 |
| Lang Creek | Downstream of Wilbur Road | 6.00 | 1,390 | * | 2,610 | 3,280 | 5,210 |
| Las Llajas Canyon Channel | At Industrial Street | 12.50 | * | * | * | 2,800 | * |
| Las Posas Estates Drain | Upstream of confluence with Camarillo Hills Drive | 2.50 | 380 | * | 1,240 | 1,710 | 3,2010 |
| Las Posas Estates Drain | Northeast of Central Avenue at elevation 103 feet | 1.88 | 310 | * | 980 | 1,360 | 2,600 |
| Mills Road Drain | At U.S. Highway 101 | 1.30 | 240 | * | 790 | 1,100 | 2,000 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Miramonte Drain | Upstream of Ventura River | 1.51 | 360 | * | 1,050 | 1,420 | 2,420 |
| Miramonte Drain | Upstream of confluence of Happy Valley Drain South | 0.79 | 200 | * | 600 | 810 | 1,390 |
| Miramonte Drain | Upstream of Loma Drive | 0.32 | 90 | * | 290 | 390 | 670 |
| Mission Drain | Downstream of Glenbrook Avenue | * | * | * | * | 570 | * |
| Mission Drain | Downstream of Coe Street | * | * | * | * | 666 | * |
| North Simi Drain | At confluence with Arroyo Simi | 2.20 | * | * | * | 1,952 | * |
| North Simi Drain | At First Street | 1.80 | * | * | * | 1,610 | * |
| North Simi Drain | At Simi Valley Freeway | 1.40 | * | * | * | 789 | * |
| Oxnard Industrial Drain | At mouth | 8.90 | 500 | * | 1,400 | 2,100 | 7,600 |
| Oxnard Industrial Drain | Above confluence of Rice Avenue Drain | 3.40 | 250 | * | 600 | 950 | 3,400 |
| Oxnard Industrial Drain | At East Wooley Road | 1.90 | 150 | * | 400 | 650 | 2,300 |
| Peach Hill Wash | Upstream of confluence with Calleguas Creek/Arroyo Las Posas/Arroyo Simi | 3.95 | 700 | * | 1,450 | 1,870 | 3,090 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Peach Hill Wash | Upstream of Home Acres Drive | 2.60 | 470 | * | 970 | 1,250 | 2,060 |
| Peach Hill Wash | Downstream of confluence of Small Dam/Debris Basin Dike | 1.13 | 530 | * | 1,100 | 1,420 | 2,350 |
| Peach Hill Wash | Upstream of Peach Hill Road | 0.43 | 240 | * | 500 | 650 | 1,080 |
| Piru Creek | At confluence with Santa Clara River | 441 | 2,500 | * | 33,000 | 41,000 | 60,000 |
| Pole Creek | At confluence with Santa Clara River | 7.80 | 2,000 | * | 4,500 | 5,700 | 10,000 |
| Ponderosa Drain | Downstream of Mobil Avenue | * | * | * | * | 308 | * |
| Reeves Creek | At confluence with Thacher Creek | 4.70 | 1,500 | * | 3,500 | 4,400 | 6,100 |
| Reeves Creek | At mouth of canyon | 2.30 | 900 | * | 2,100 | 2,600 | 3,600 |
| Revolon Slough | Downstream of Camarillo Hills Drain | 38.70 | 2,500 | * | 7,100 | 10,000 | 20,000 |
| Revolon Slough | At Highway 101 | 30.00 | 2,200 | * | 6,200 | 8,700 | 16,500 |
| Rice Avenue Drain | At Rose Avenue | 4.40 | 230 | * | 600 | 900 | 3,050 |
| Rice Avenue Drain | At Etting Road | 4.10 | 200 | * | 550 | 800 | 2,600 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Rice Avenue Drain | At Ventura County limits south of Wooley Road | 2.20 | 50 | * | 110 | 150 | 1,500 |
| Rice Avenue Drain | At downstream crossing of Southern Pacific Railroad | 1.90 | 30 | * | 45 | 50 | 1,500 |
| Rice Avenue Drain | Approximately 500 feet upstream of Southern Pacific Railroad crossing | 1.30 | 110 | * | 300 | 500 | 1,650 |
| Rincon Creek | At confluence with Pacific Ocean | 14.60 | 2,990 | * | 7,530 | 10,320 | * |
| Rincon Creek | At U.S. Highway 101 culvert | 14.60 | 2,990 | * | 7,530 | 8,500 | * |
| Rincon Creek | Upstream of U.S. Highway 101 culvert | 14.60 | 2,990 | * | 7,530 | 10,320 | * |
| Runkle Canyon | At confluence with Arroyo Simi | 2.80 | * | * | * | 1,400 | * |
| Runkle Canyon | At Fitzgerald Road | 2.40 | * | * | * | 1,200 | * |
| San Antonio Creek | At confluence with Ventura River | 51.20 | 7,000 | * | 15,700 | 19,900 | 30,000 |
| San Antonio Creek | Downstream of confluence of Lion Creek | 46.70 | 6,400 | * | 14,400 | 18,200 | 27,400 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| San Antonio Creek | Upstream of confluence of Lion Creek | 34.00 | 5,200 | * | 11,700 | 14,800 | 23,300 |
| San Antonio Creek | Downstream of confluence of Stewart Canyon | 31.50 | 4,900 | * | 11,000 | 14,000 | 21,000 |
| San Antonio Creek | Upstream of confluence of Stewart Canyon | 26.00 | 4,200 | * | 9,500 | 12,000 | 18,000 |
| San Antonio Creek | Downstream of confluence of Thacher Creek | 24.90 | 4,200 | * | 9,600 | 12,000 | 18,000 |
| San Antonio Creek | Upstream of confluence of Thacher Creek | 15.00 | 2,500 | * | 5,600 | 7,000 | 11,000 |
| San Antonio Creek | Upstream of confluence of McNell Creek | 12.10 | 2,500 | * | 5,600 | 7,000 | 11,000 |
| San Antonio Creek | Downstream of confluence of Gridley Canyon | 9.70 | 2,100 | * | 4,700 | 5,800 | 9,200 |
| Santa Clara Ditch | Upstream of Nyeland Sump | 9.26 | 920 | * | 3,120 | 4,430 | 8,200 |
| Santa Clara Ditch | Upstream of Central Avenue | 6.65 | 750 | * | 2,530 | 3,580 | 6,600 |
| Santa Clara River | At mouth | 1,625 | 41,000 | * | 116,000 | 161,000 | 270,000 |
| Santa Clara River | At Willard Bridge | 1,534 | 41,000 | * | 116,000 | 161,000 | 270,000 |
| Santa Clara River | Upstream of confluence of Santa Paula Creek | 1,505 | 40,000 | * | 113,000 | 157,000 | 265,000 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Santa Clara River | Downstream of confluence of Sespe Creek | 1,500 | 40,000 | * | 113,000 | 157,000 | 265,000 |
| Santa Clara River | Upstream of confluence of Sespe Creek | 1,182 | 23,000 | * | 66,000 | 92,000 | 160,000 |
| Santa Clara River | Downstream of confluence of Hopper Creek | 1,174 | 40,000 | * | 113,000 | 157,000 | 265,000 |
| Santa Clara River | Downstream of confluence of Piru Creek | 1,100 | 40,000 | * | 113,000 | 157,000 | 265,000 |
| Santa Clara River | At Ventura County/Los Angeles County boundary | 644 | 15,000 | * | 43,000 | 60,000 | 104,000 |
| Santa Clara River Breakout | At mouth at Pacific Ocean | * | * | * | 28,000 | 73,000 | 182,000 |
| Santa Paula Creek | Downstream of confluence with Mud Creek (north of the City of Santa Paula) | 42 | 7,300 | * | 19,000 | 28,000 | 51,000 |
| Santa Paula Creek | At stream gauging station | 40 | 6,800 | * | 18,000 | 26,000 | 48,000 |
| Sespe Creek | Approximately 4,000 feet downstream of Highway 126 | 263 | 33,000 | * | 72,000 | 92,000 | 145,000 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Sespe Creek | Approximately 5,000 feet upstream of Southern Pacific Railroad | 259 | 29,000 | * | 62,000 | 80,000 | 131,000 |
| Somis Drain | At Corby Avenue | * | * | * | * | 582 | * |
| Somis Drain | At Shepherd Drive | * | * | * | * | 952 | * |
| South Branch Arroyo Conejo | Upstream of Ventura Freeway | 10.72 | 1,470 | * | 4,850 | 6,800 | 12,800 |
| South Branch Arroyo Conejo | Upstream of Jenny Drive Extension | 7.46 | 1,210 | * | 4,000 | 5,700 | 10,700 |
| Stewart Canyon | Upstream of confluence with San Antonio Creek | 5.00 | 1,400 | * | 3,800 | 5,500 | 7,900 |
| Stewart Canyon Storm Channel | At confluence with San Antonio Creek | 5.00 | 2,400 | * | 4,600 | 5,500 | 7,900 |
| Stewart Canyon Storm Channel | Upstream of confluence with Fox Canyon | 2.60 | 980 | * | 2,200 | 2,700 | 3,900 |
| Sycamore Canyon | Below detention dam | * | * | * | * | 184 | * |
| Tapo Canyon Channel | At confluence with Arroyo Simi | 20.70 | * | * | * | 8,500 | * |
| Tapo Canyon Channel | At Tapo Canyon Road | 17.80 | * | * | * | 8,500 | * |
| Telephone Road Drain | At confluence with Arundel' Barranca | 2.02 | 430 | * | 1,290 | 1,760 | 3,300 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Telephone Road Drain | Upstream of U.S. Highway 101 | 1.68 | 375 | * | 1,110 | 1,500 | 2,800 |
| Thacher Creek | At confluence with San Antonio Creek | 10.60 | 2,300 | * | 5,400 | 6,800 | 9,500 |
| Thacher Creek | Downstream of confluence of Reeves Creek | 8.70 | 2,200 | * | 5,200 | 7,600 | 9,200 |
| Thacher Creek | Upstream of confluence of Reeves Creek | 3.70 | 1,100 | * | 2,500 | 3,200 | 4,500 |
| Thacher Creek | At mouth of canyon | 3.30 | 1,300 | * | 3,000 | 3,800 | 5,300 |
| Thousand Oaks North Drain | Upstream of confluence of Arroyo Conejo | 1.26 | 780 | * | 1,490 | 1,870 | 2,970 |
| Thousand Oaks North Drain | At State Highway 23 | 1.13 | 740 | * | 1,420 | 1,780 | 2,830 |
| Thousand Oaks North Drain | At La Jolla Drive | 0.90 | 630 | * | 1,210 | 1,530 | 2,420 |
| Tributary to Arroyo Santa Rosa | Upstream of confluence with Arroyo Santa Rosa | 3.75 | 950 | * | 2,590 | 3,700 | 6,720 |
| Tributary to Arroyo Santa Rosa | At Vista Arroyo Drive | 1.73 | 550 | * | 1,060 | 1,330 | 2,110 |
| Ventura River | At Pacific Ocean | 226 | 34,000 | * | 67,000 | 78,000 | 103,000 |
| Ventura River | At Shell Chemical Plant | 222 | 34,000 | * | 66,000 | 77,000 | 102,000 |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Ventura River | At Casitas Vista Road | 184 | 30,000 | * | 58,000 | 68,000 | 90,000 |
| Ventura River | At Casitas Springs | 143 | 29,000 | * | 55,000 | 65,000 | 86,000 |
| Ventura River | At Baldwin Road | 81.00 | 16,000 | * | 31,000 | 36,000 | 48,000 |
| Ventura River | Downstream of confluence of North Fork Matilija Creek | 70.40 | 15,000 | * | 30,000 | 34,500 | 46,000 |
| Ventura River | Upstream of confluence of North Fork Matilija Creek | 54.30 | 12,000 | * | 23,500 | 27,500 | 36,500 |
| Walnut Canyon Drain | At Walnut Canyon Road | 0.61 | 310 | * | 640 | 820 | 1,360 |
| West Camarillo Hills Tributary | At Euclid Avenue | * | * | * | * | 820 | * |
| West Wooley Drain | At West Hemlock Street | 0.80 | 100 | * | 300 | 450 | 1,550 |
| West Wooley Drain | At Ventura Railway crossing | 0.20 | 25 | * | 70 | 100 | 390 |
| White Oak Creek | At confluence with Arroyo Simi | 4.20 | * | * | * | 3,470 | * |
| White Oak Creek | At confluence with Hummingbird Creek | 3.70 | * | * | * | 2,670 | * |

**Table 10: Summary of Discharges, continued**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| White Oak Creek | At freeway | 1.50 | * | * | * | 960 | * |

*Data not available

[1]Decrease due to overbank losses upstream

[2]Decrease due to Bajo Aqua timing of hydrograph attenuation

**Figure 7: Frequency Discharge-Drainage Area Curves**

**[Not Applicable to this Flood Risk Project]**

**Table 11: Summary of Non-Coastal Stillwater Elevations**

**[Not Applicable to this Flood Risk Project]**

**Table 12: Stream Gage Information used to Determine Discharges**

| Flooding Source | Gage Identifier | Agency that Maintains Gage | Site Name | Drainage Area (Square Miles) | Period of Record | |
|---|---|---|---|---|---|---|
| | | | | | From | To |
| Honda Barranca | * | USGS | * | * | * | 19 yrs. |
| Westminster | * | Orange County Flood Control District | * | * | * | 18 yrs. |

*Data not available

## 5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed on Table 24, "Floodway Data."

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 13. Roughness coefficients are provided in Table 14. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

## Table 13: Summary of Hydrologic and Hydraulic Analyses

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Adams Canyon | Confluence with Santa Clara River | At Telegraph Road | HEC-1 | HEC-2 | 1988 | A | |
| Adams Canyon | At Telegraph Road | Approximately 1.1 miles upstream of Telegraph Road | HEC-1 | HEC-2 | 1988 | AE | The peak discharges were determined using the unit hydrograph method. |
| Adams Canyon | Approximately 1.1 miles upstream of Telegraph Road | Approximately 4,620 feet upstream of Foothill Road | HEC-1 | HEC-2 | 1988 | A | |
| Alamos Canyon | Confluence with Arroyo Simi | Approximately 3,835 feet upstream of Scarab Fire Road | HEC-1 | HEC-2 | 1988 | AE | |
| Arroyo Colorado | Confluence with Honda Barranca | Approximately 1,850 feet upstream of East La Loma Avenue | Log-Pearson Type III | HEC-2 | 1988 | A | |
| Arroyo Conejo | Confluence with Conejo Creek | Approximately 190 feet upstream of El Camino Real | HEC-1 | HEC-2 | 1976 | A | |
| Arroyo Las Posas | Confluence with Calleguas Creek | Confluence with Arroyo Simi | HEC-1 | HEC-2 | 1988 | AE w/ Floodway | |
| Arroyo Santa Rosa | Confluence with Conejo Creek | Approximately 3,035 feet upstream of East Las Posas Road | VCRAT 2.2 | HEC-RAS 3.1 | 2004; Revised 2008 | AE w/ Floodway | |
| Arroyo Santa Rosa | Approximately 3,035 feet upstream of East Las Posas Road | Approximately 740 feet upstream of Lexington Hills Drive | HEC-1 | HEC-2 | 2004; Revised 2008 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Arroyo Santa Rosa | Approximately 740 feet upstream of Lexington Hills Drive | Approximately 2,600 feet upstream of State Highway 23 (Moorpark Freeway) | VCRAT 2.2 | HEC-RAS 3.1 | 2004; Revised 2008 | AE w/ Floodway | |
| Arroyo Santa Rosa Tributary | Confluence with Arroyo Santa Rosa | Approximately 420 feet upstream of Santa Rosa Bridge | VCRAT 2.2 | HEC-RAS 3.1 | 2004; Revised 2008 | AE w/ Floodway | |
| Arroyo Simi | Confluence with Arroyo Las Posas | Approximately 4,095 feet upstream of Kuehner Drive | VCRAT | HEC-2 | 1995 | AE w/ Floodway | For the main stem below its confluence with Tapo Canyon and Runkle Canyon, a HEC-1 model developed by the Los Angeles District, USACE, for their 1987 Calleguas Creek Hydrology Report (USACE, 1987) was used.<br>For the upper reaches of Arroyo Simi within the City of Simi Valley, values were taken from VCWPD Modified Rational Method (Ventura County, 1985) computer output and adjusted for precipitation depth-area relation of the tributary area.<br>Peak discharges were originally obtained from a hydrology report prepared by the USACE for use in special flood hazard study (USACE, August 1977). |
| Arundell Barranca | At Beachmont Street | Approximately 1,700 feet upstream of Mills Road Drain | HEC-1 | HEC-2 | 1983 | A | |
| Arundell Barranca | At Highway 126 West Drain | Approximately 465 feet upstream of Highway 126 West Darin | HEC-1 | HEC-2 | 1983 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Arundell Barranca | Approximately 35 feet downstream of Foothill Road | Approximately 2,000 feet upstream of Foothill Road | HEC-1 | HEC-2 | 1983 | A | |
| Arundell Barranca | Approximately 16 feet upstream of Plainview Street | Approximately 85 feet upstream of Plainview Street | HEC-1 | HEC-2 | 1983 | A | |
| Auto Center Drain | Approximately 80 feet east of the intersection of Santa Clara Avenue and Fredrich Road | Approximately 4,400 feet upstream of the intersection of Santa Clara Avenue and Fredrich Road | HEC-1 | HEC-2 | 1988 | AH | |
| Balcom Canyon Wash | Confluence with Santa Clara River | Approximately 3,000 feet upstream of Hardnego Road | HEC-1 | HEC-2 | 1988 | A | |
| Barbara Drive Drain | Confluence with Conejo Creek | Approximately 1,770 feet upstream of Rosita Road | HEC-1 | HEC-2 | 1988 | A | |
| Bardsdale Ditch | Confluence with Santa Clara River | Approximately 2,560 feet upstream of Los Angeles Avenue | HEC-1 | HEC-2 | 1988 | A | |
| Basolo Ditch | Confluence with Santa Clara River | Approximately 1,800 feet upstream of East Guiberson Road | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Bear Creek | Confluence with Santa Clara River | Approximately 4,750 feet upstream of Sycamore Road | HEC-1 | HEC-2 | 1988 | A | |
| Beardsley Wash | Approximately 2,088 feet downstream of Wright Road | Approximately 1,290 feet upstream of Wright Road | HEC-1 | HEC-2 | 1988 | AE w/ Floodway | The upstream study reach water-surface elevations of floods of selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (USACE, October 1973). |
| Beardsley Wash | Approximately 1,290 feet upstream of Wright Road | Confluence of Honda Barranca | HEC-1 | HEC-2 | 1988 | A | |
| Bell Canyon Creek | Ventura/Los Angeles county boundary | Approximately 70 feet downstream of North Buckskin Court | HEC-1 | HEC-2 | 1988 | AE | |
| Big Canyon | Confluence with Lion Canyon Creek | Approximately 1,600 feet upstream of confluence with Lion Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |
| Big Mountain Canyon | Confluence with Tapo Canyon | Approximately 475 feet upstream of Tapo Canyon Road | HEC-1 | HEC-2 | 1988 | A | |
| Big Sycamore Canyon Creek | Mouth at Pacific ocean | Approximately 2,500 feet upstream of Ranch Center Road | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Big Sycamore Canyon Tributary | Confluence with Big Sycamore Canyon Creek | Approximately 900 feet upstream of confluence with Big Sycamore Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |
| Blanchard Canyon | Confluence with Piru Creek | Approximately 690 feet upstream of Piru Canyon Road | HEC-1 | HEC-2 | 1988 | A | |
| Boosey Canyon | Confluence with Timber Canyon | Approximately 2,760 feet upstream of the confluence with Timber Canyon | HEC-1 | HEC-2 | 1988 | A | |
| Boulder Canyon | Confluence with Sespe Creek | Approximately 1.1 miles upstream of Sycamore Road | HEC-1 | HEC-2 | 1988 | A | |
| Brea Canyon | Approximately 1,600 feet downstream of American Street | Approximately 200 feet upstream of Brea Canyon Road | HEC-1 | HEC-2 | 1988 | A | |
| Brown Barranca | Confluence with Santa Clara River | Approximately 200 feet downstream of Blackburn Road | HEC-1 | HEC-2 | 1983 | A, AH | |
| Brown Barranca | Approximately 200 feet downstream of Blackburn Road | Approximately 500 feet upstream of Telegraph Avenue | HEC-1 | HEC-2 | 1983 | AE | |
| Bus Canyon Drain | Confluence with Arroyo Simi | At Los Angeles Avenue | VCRAT | HEC-2 | 1995 | AE | |
| Bus Canyon Drain | At Los Angeles Avenue | Approximately 795 feet downstream of Ventura Avenue | VCRAT | HEC-2 | 1995 | AO | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Bus Canyon Drain | Approximately 795 feet downstream of Ventura Avenue | At Royal Avenue | VCRAT | HEC-2 | 1995 | AE | |
| Bus Canyon Drain | At Royal Avenue | Approximately 330 feet upstream of Royal Avenue | VCRAT | HEC-2 | 1995 | AO | |
| Bus Canyon Drain | Approximately 330 feet upstream of Royal Avenue | Approximately 250 feet upstream of East Bennet Street | VCRAT | HEC-2 | 1995 | AE | |
| Bus Canyon Drain | Approximately 250 feet upstream of East Bennet Street | At 1st Street | VCRAT | HEC-2 | 1995 | A | |
| Bus Canyon Drain Tributary | Confluence with Bus Canyon Drain | At Newman Street | VCRAT | HEC-2 | 1995 | AH, AO | |
| Bus Canyon Drain Tributary | At Newman Street | At Dakin Avenue | VCRAT | HEC-2 | 1995 | AE | |
| Bus Canyon Drain Tributary | At Dakin Avenue | Approximately 630 feet upstream of Dakin Avenue | VCRAT | HEC-2 | 1995 | AH, AO | |
| Bus Canyon Drain Tributary | Approximately 630 feet upstream of Dakin Avenue | Approximately 1,975 feet upstream of Dakin Avenue | VCRAT | HEC-2 | 1995 | AE | |
| Calleguas Creek | Approximately 900 feet downstream of Southbound Highway 1 | Approximately 2.4 miles upstream of Upland Road | VCRAT 2.2 | FLO-2D | 2008 | AE w/ Floodway | The hydrology was retained from the effective analysis. The original 100 year event hydrograph data was applied using inflow nodes in a 1D/2D hydraulic model in the flood route modeling software FLO-2D.<br>Peak discharges were taken from a hydrology report prepared by the USACE for use in a special flood hazard study of that area (USACE, January 1971). |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Camarillo Hills Drain | Confluence with Revolon Slough | Approximately 2,860 feet downstream of Las Posas Estates Drain | VCRAT; HEC-HMS | FLO-2D | 2011 | A | |
| Camarillo Hills Drain | Approximately 2,860 feet downstream of Las Posas Estates Drain | Approximately 2.25 miles upstream of Las Posas Estates Drain | VCRAT; HEC-HMS | FLO-2D | 2011 | AE w/ Floodway | The hydrology was retained from the effective analysis. The original 100 year event hydrograph data was applied using inflow nodes in a 1D/2D hydraulic model in the flood route modeling software FLO-2D. |
| Camarillo Hills Drain | Approximately 2.25 miles upstream of Las Posas Estates Drain | At Arneill Road | VCRAT; HEC-HMS | FLO-2D | 2011 | AE | The hydrology was retained from the effective analysis. The original 100 year event hydrograph data was applied using inflow nodes in a 1D/2D hydraulic model in the flood route modeling software FLO-2D. |
| Canada De Aliso | Confluence with Canada Larga | Approximately 145 feet upstream of Canada Larga Road | HEC-1 | HEC-2 | 1988 | A | |
| Canada Larga | Confluence with Ventura River | Approximately 825 feet upstream of confluence of Sulphur Canyon | HEC-1 | HEC-2 | 1988 | A | |
| Chivo Canyon | Confluence with Las Llajas Canyon channel | Approximately 3,545 feet upstream of Cottonwood Drive | VCRAT | HEC-2 | 1995 | A | |
| Conejo Creek | Confluence with Calleguas Creek | Confluences of Arroyo Conejo and Arroyo Santa Rosa | VCRAT 2.2 | HEC-RAS 3.1 | 2004; Revised 2008 | AE w/ Floodway | Peak discharges were taken from a hydrology report prepared by the USACE for use in a special flood hazard study of that area (USACE, January 1971). |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Conejo Mountain Creek | Approximately 1,300 feet upstream of Desert Creek Court | Approximately 390 feet upstream of Calle del Prado | HEC-1 | HEC-2 | 1976 | A | |
| Conejo Mountain Creek | At Via de la Mesa | Approximately 2,700 feet upstream of Via Rincon | HEC-1 | HEC-2 | 1976 | A | |
| Conejo Park Creek | Confluence with Conejo Creek | Approximately 350 feet upstream of Howard Road | HEC-1 | HEC-2 | 1983 | A | |
| Cooper Canyon Creek | Confluence with Santa Ana Creek | Approximately 1,360 feet upstream of confluence with Santa Ana Creek | HEC-1 | HEC-2 | 1988 | A | |
| Coyote Canyon | Confluence with Arroyo Las Posas | Approximately 2,810 feet upstream of State Route 118 | HEC-1 | HEC-2 | 1988 | A | |
| Coyote Canyon | Approximately 855 feet downstream of Bradley Road | Approximately 1,345 feet upstream of Solano Verde Road | HEC-1 | HEC-2 | 1988 | A | |
| Coyote Canyon Wash | Confluence with Coyote Canyon | Approximately 150 feet upstream of La Cumbre Road | HEC-1 | HEC-2 | 1988 | A | |
| Coyote Creek | Confluence with Ventura River | Approximately 1.9 miles upstream of Camp Chaffee Road | HEC-1 | HEC-2 | 1988 | AE | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Coyote Creek | Approximately 1.9 miles upstream of Camp Chaffee Road | Approximately 2 miles upstream of Camp Chaffee Road | HEC-1 | HEC-2 | 1988 | A | |
| Cozy Del Canyon | Confluence with Ventura River | Approximately 950 feet upstream of North Rice Road | HEC-1 | HEC-2 | 1988 | AE | |
| Cozy Del Canyon | Approximately 950 feet upstream of North Rice Road | Approximately 1,110 feet upstream of Maricopa Highway | HEC-1 | HEC-2 | 1988 | A | |
| Donlon Drain | Confluence with Puerta Zuela Barranca | Approximately 1,400 feet upstream of confluence with Puerta Zuela Barranca | HEC-1 | HEC-2 | 1988 | A | |
| Doris Avenue Drain | Confluence with East Street Drain | Approximately 0.8 miles upstream of confluence with East Street Drain | HEC-1 | HEC-2 | 1988 | A | |
| Dron Creek | Confluence with San Antonio Creek | Approximately 440 feet upstream of Gridley Road | HEC-1 | HEC-2 | 1988 | AE, AO | |
| Dry Canyon Creek | Confluence with Arroyo Simi | Approximately 1,190 feet upstream of Alamo Street | VCRAT | HEC-2 | 1995 | AE | |
| Dry Canyon Creek | Approximately 1,190 feet upstream of Alamo Street | Approximately 600 feet upstream of confluence of Dry Canyon Tributary | VCRAT | HEC-2 | 1995 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Dry Canyon Creek | Approximately 600 feet upstream of confluence of Dry Canyon Tributary | Approximately 125 feet downstream of Lost Canyon Drive | VCRAT | HEC-2 | 1995 | AE | |
| Dry Canyon Tributary | Confluence with Dry Canyon Creek | Approximately 540 feet upstream of confluence with Dry Canyon Creek | VCRAT | HEC-2 | 1995 | A | |
| E Street Drain | Approximately 2,240 feet downstream of West Wooley Road | Approximately 3,830 feet upstream of West 5th Street | HEC-1 | HEC-2 | 1977 | A | |
| East Camarillo Drain | At Adolfo Road | Approximately 870 feet upstream of confluence of East Camarillo Drain Tributary | HEC-1 | FLOD-2D | 2011 | AE | |
| East Camarillo Drain Tributary | Confluence with East Camarillo Drain | Approximately 660 feet upstream of confluence with East Camarillo Drain | HEC-1 | FLO-2D | 2011 | AE | |
| East Fork Honda Barranca | Confluence with Honda Barranca | Approximately 1,630 feet upstream of East La Loma Avenue | Log-Pearson Type III | HEC-2 | 1988 | A | |
| East Fork Lord Creek | Confluence with Boulder Creek | Approximately 2,600 feet upstream of Young Road | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| East Fork Tripas Canyon | Approximately 605 feet downstream of Tripps Canyon Road | Approximately 3,085 feet upstream of Tripps Canyon Road | HEC-1 | HEC-2 | 1988 | A | |
| East Las Virgenes Canyon Creek | Confluence with Las Virgenes Canyon Creek | Approximately 2,630 feet upstream of confluence of East Las Virgenes Creek | HEC-1 | HEC-2 | 1988 | A | |
| East Las Virgenes Creek | Confluence with East Las Virgenes Canyon Creek | Approximately 2,620 feet upstream of confluence with East Las Virgenes Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |
| East Tributary | Confluence with Dry Canyon Creek | Approximately 235 feet upstream of Sycamore Drive | VCRAT | HEC-2 | 1995 | AO | |
| East Tributary Meier Canyon | Confluence with Meier Canyon Creek | Approximately 2,930 feet upstream of confluence with Meier Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |
| East Tributary Somis Drain | Approximately 210 feet upstream of North Adolfo Road | Approximately 230 feet downstream of Las Posas Road | VCRAT | FLO-2D | 2011 | AO | |
| Edgemore Drain | Confluence with Camarillo Hills Drain | Approximately 2,350 feet upstream of Aileen Street | VCRAT; HEC-HMS | FLO-2D | 2011 | AE, AO | The hydrology was retained from the effective analysis. The original 100 year event hydrograph data was applied using inflow nodes in a 1D/2D hydraulic model in the flood route modeling software FLO-2D. |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Edwards Canyon | Confluence with Santa Clara River | Approximately 1,770 feet upstream of Camulos Street | HEC-1 | HEC-2 | 1988 | A | |
| Ellsworth Barranca | Confluence with Santa Clara River | Approximately 1.5 miles upstream of confluence of Aliso Canyon West Fork | HEC-1 | HEC-2 | 1988 | A | |
| Erringer Drain | Confluence with Arroyo Simi | Approximately 1,500 feet upstream of Fitzgerald Road | VCRAT | HEC-2 | 1995 | AE, AO | |
| Eureka Canyon | Confluence with Santa Clara River | Approximately 0.6 miles upstream of confluence with Santa Clara River | HEC-1 | HEC-2 | 1988 | A | |
| Fagan Canyon | Confluence with Santa Clara River | Approximately 3,310 feet upstream of West Santa Paula Street | Log-Pearson Type III | HEC-2 | 1995 | AE, AO | The peak discharges were reduced from previously generated values (USACE, April 1977) to account for a change in drainage area size.<br>The profile illustrates only the water-surface elevation or flows contained within the channel up to the Southern Pacific Railroad tracks; below this point, the profile is only for the flows that enter the concrete ditch. |
| Fagan Canyon | Approximately 3,310 feet upstream of West Santa Paula Street | Approximately 1 mile upstream of West Santa Paula Street | Log-Pearson Type III | HEC-2 | 1995 | A | |
| Fairview Canyon Creek | Confluence with Santa Clara River | Approximately 1,310 feet upstream of State Route 126 | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Fox Barranca | Confluence with Coyote Canyon | Approximately 1,428 feet upstream of Berylwood Road | HEC-1 | HEC-2 | 1988 | A | |
| Fox Canyon Storm Drain | Confluence with Stewart Canyon Creek | Approximately 1,424 feet upstream of north Montgomery Street | HEC-1 | HEC-2 | 1977 | AE w/ Floodway | Water-surface elevations for the upstream segment from a point 9,490 feet above Daly Road to the corporate limits were obtained by hand calculations using Manning's equation. |
| Franklin Barranca | Confluence with Santa Clara River | Approximately 4,575 feet upstream of confluence with Santa Clara River | HEC-1 | HEC-2 | 1983 | A | |
| Frey Canyon Creek | Confluence with Santa Clara River | Approximately 2,165 feet upstream of East Guiberson Road | HEC-1 | HEC-2 | 1988 | A | |
| Gabbert Canyon Creek | Approximately 360 feet upstream of Los Angeles Avenue/State Route 118 | Approximately 3,030 feet upstream of Los Angeles Avenue/State Route 118 | HEC-1 | HEC-2 | 1983 | A | |
| Gill Barranca | Confluence with Fox Barranca | Approximately 1,390 feet upstream of Berylwood Road | HEC-1 | HEC-2 | 1988 | A | |
| Gillibrand Canyon Creek | Confluence with Tapo Canyon Creek | Approximately 3,570 feet upstream of confluence of Gillibrand Canyon Tributary | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Guadalasca Road Drain | Approximately 3,370 feet upstream of Broome Ranch Road | Approximately 1.6 miles upstream of Broome Ranch Road | HEC-1 | HEC-2 | 1988 | A | |
| Haines Barranca | Confluence with Adams Canyon | Approximately 145 feet upstream of Foothill Road | HEC-1 | HEC-2 | 1988 | A | |
| Hammond Canyon Creek | Confluence with Sulphur Canyon | Approximately 1.6 miles upstream of confluence with Sulphur Canyon | HEC-1 | HEC-2 | 1988 | AE | |
| Happy Camp Canyon Creek | Confluence with Arroyo Simi | Approximately 1.9 miles upstream of Little Happy Camp Canyon | HEC-1 | HEC-2 | 1983 | A | |
| Happy Camp Canyon Tributary | Confluence with Happy Camp Canyon Creek | Approximately 1,580 feet upstream of confluence with Happy Camp Canyon Creek | HEC-1 | HEC-2 | 1983 | A | |
| Happy Valley Drain | Confluence with McDonald Canyon Drain | Approximately 80 feet upstream of divergence with Happy Valley Drain South | HEC-1 | HEC-2 | 1988 | A | |
| Happy Valley Drain | Approximately 80 feet upstream of divergence with Happy Valley Drain South | Approximately 200 feet upstream of El Roblar Drive | HEC-1 | HEC-2 | 1988 | AE | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Happy Valley Drain South | At mouth | Confluence with Miramonte Drain | HEC-1 | HEC-2 | 1988 | AE | |
| Harmon Barranca | Confluence with Santa Clara River | Approximately 3,110 feet upstream of confluence with Santa Clara River | HEC-1 | HEC-2 | 1983 | A | |
| Harmon Barranca | At Southern Pacific Railroad | Approximately 500 feet upstream of Ralston Street | HEC-1 | HEC-2 | 1983 | AE | |
| Hidden Valley Wash | Confluence with Lake Sherwood | Approximately 1,320 feet upstream of Hidden Valley Road | HEC-1 | HEC-2 | 1988 | A | |
| Hill Canyon | Confluence with Arroyo Conejo | Approximately 2,130 feet upstream of confluence with Arroyo Conejo | HEC-1 | HEC-2 | 1976 | A | |
| Hilltop Lane Drain | Confluence with Conejo Creek | Approximately 2,745 feet upstream of Santa Rosa Road | HEC-1 | HEC-2 | 1988 | A | |
| Holser Canyon Creek | Confluence with Piru Creek | Approximately 670 feet upstream of the confluence of Ramona Canyon | HEC-1 | HEC-2 | 1988 | A | |
| Honda Barranca | Confluence with Beardsley Wash | Approximately 2,180 feet upstream of East La Loma Avenue | Log-Pearson Type III | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Honda Barranca Tributary | Confluence with Honda Barranca | Approximately 1.1 miles upstream of Price Road | Log-Pearson Type III | HEC-2 | 1988 | A | |
| Hopper Canyon Creek | Confluence with Santa Clara River | Approximately 1.7 miles upstream of confluence of Toms Canyon | HEC-1 | HEC-2 | 1988 | A | |
| Hummingbird Creek | Confluence with White Oak Creek | Approximately 895 feet upstream of Ronald Reagan Freeway | VCRAT | HEC-2 | 1993 | A, AH | |
| Hummingbird Creek Tributary | Confluence with Hummingbird Creek | Approximately 480 feet upstream of confluence with Hummingbird Creek | VCRAT | HEC-2 | 1993 | AH | |
| Hunt Wash | Confluence with Arroyo Las Posas | Approximately 870 feet upstream of confluence with Arroyo Las Posas | HEC-1 | HEC-2 | 1988 | AE | |
| Hunt Wash | Approximately 870 feet upstream of confluence with Arroyo Las Posas | Approximately 1,100 feet upstream of Meadowglade Drive | HEC-1 | HEC-2 | 1988 | A | |
| J Street Drain | At mouth | Approximately 550 feet upstream of mouth | HEC-1 | HEC-2 | 1977 | AE | The HEC-2 program (USACE, 1973) was used to evaluate the capacities. |
| Javon Canyon | At mouth | Approximately 775 feet upstream of U.S. Highway 101 | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Jepson Wash | Confluence with Sespe Creek | Approximately 1,070 feet upstream of Oak Avenue | HEC-1 | HEC-2 | 1988 | A | |
| Kenny Grove Creek | Confluence with Sespe Creek | Approximately 700 feet upstream of Oak Avenue | HEC-1 | HEC-2 | 1988 | A | |
| Koenigstein Road Wash | Confluence with Sisar Creek | Approximately 1,730 feet upstream of confluence with Sisar Creek | HEC-1 | HEC-2 | 1988 | A | |
| La Jolla Canyon | At mouth | Approximately 1,915 feet upstream of mouth | HEC-1 | HEC-2 | 1988 | A | |
| Lake Eleanor Creek | Approximately 2,070 feet upstream of Carlise Road | Approximately 3,750 feet upstream of Carlise Road | HEC-1 | HEC-2 | 1976 | A | |
| Lake Piru | At Santa Felicia Dam | At Las Padres National Forest | HEC-1 | HEC-2 | 1988 | A | |
| Lake Sherwood | Confluence with Potrero Creek | Confluence with Hidden Valley Wash | HEC-1 | HEC-2 | 1988 | A | |
| Lake Sherwood | Approximately 300 feet upstream of East Potrero Road | Approximately 4,245 feet upstream of East Potrero Road | HEC-1 | HEC-2 | 1988 | A | |
| Lang Creek | Approximately 3,060 feet downstream of Hillcrest Drive | Approximately 515 feet upstream of Combes Avenue | VCRAT 2.2 | HEC-RAS 3.1 | 2004 | AE | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Las Llajas Canyon Channel | Confluence with Arroyo Simi | Approximately 1.1 miles upstream of Alamo Street | VCRAT | HEC-2 | 1995 | AE | |
| Las Llajas Canyon Channel | Approximately 1.1 miles upstream of Alamo Street | Approximately 4,570 feet upstream of Yosemite Avenue | VCRAT | HEC-2 | 1995 | A | |
| Las Posas Estates Drain | Confluence with Camarillo Hills Drain | Approximately 3,000 feet upstream of Camarillo Hills Drain | HEC-1 | HEC-2 | 1983 | A | |
| Las Posas Estates Drain | Approximately 3,000 feet upstream of Camarillo Hills Drain | Approximately 1.6 miles upstream of Central Avenue | HEC-1 | HEC-2 | 1983 | AE | |
| Las Posas Estates Drain | Approximately 1.6 miles upstream of Central Avenue | Approximately 530 feet upstream of Avocado Place | HEC-1 | HEC-2 | 1983 | A | |
| Las Sauces Creek | At mouth | Approximately 830 feet upstream of State Route 1 | HEC-1 | HEC-2 | 1988 | A | |
| Las Virgenes Canyon Creek | At county boundary | Approximately 870 feet upstream of confluence of Las Virgenes Creek Tributary | HEC-1 | HEC-2 | 1988 | A | |
| Las Virgenes Canyon Tributary | Confluence with Las Virgenes Canyon Creek | Approximately 355 feet upstream of confluence with Las Virgenes Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Laskey Mesa West | Confluence with East Las Vingenes Canyon Creek | Approximately 2,225 feet upstream of confluence with East Las Vingenes Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |
| Lime Canyon | Confluence with Piru Creek | Approximately 1,140 feet upstream of Piru Canyon Road | HEC-1 | HEC-2 | 1988 | A | |
| Lindero Creek | At county boundary | Approximately 2,815 feet upstream of county boundary | HEC-1 | HEC-2 | 1988 | A | |
| Lion Canyon Creek | Confluence with San Antonio Creek | Approximately 3,285 feet upstream of confluence of Big Canyon | HEC-1 | HEC-2 | 1988 | A | |
| Little Happy Camp Canyon | Confluence with Happy Camp Canyon Creek | Approximately 1,900 feet upstream of confluence of Little Happy Camp Canyon Tributary | HEC-1 | HEC-2 | 1983 | A | |
| Little Happy Camp Canyon Tributary | Confluence with Little Happy Camp Canyon | Approximately 570 feet upstream of confluence with Little Happy Camp Canyon | HEC-1 | HEC-2 | 1983 | A | |
| Little Sycamore Canyon | At mouth | Approximately 255 feet upstream of State Route 1 | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Long Canyon Creek | Confluence with Arroyo Las Posas | Approximately 1,375 feet upstream of Waters Road | HEC-1 | HEC-2 | 2004 | A | |
| Long Grade Canyon | Confluence with Calleguas Creek | Approximately 1,225 feet upstream of Rincon Drive | HEC-1 | HEC-2 | 1988 | AE | |
| Long Grade Canyon | Approximately 1,225 feet upstream of Rincon Drive | Approximately 1.5 miles upstream of Rincon Drive | HEC-1 | HEC-2 | 1988 | A | |
| Madranio Canyon | At mouth | Approximately 1,150 feet upstream of State Route 1 | HEC-1 | HEC-2 | 1988 | A | |
| Magnolia Creek | Approximately 70 feet upstream of Fairweather Crossing | Approximately 1 mile upstream of Fairweather Crossing | HEC-1 | HEC-2 | 1988 | A | |
| Mahan Barranca | Confluence with Arroyo Las Posas | Approximately 1,280 feet upstream of Old Balcom Canyon Road | HEC-1 | HEC-2 | 1988 | A | |
| Maxy Canyon | Confluence with South Fork Canada De Los Alamos | Approximately 3,690 feet upstream of confluence with South Fork Canada De Los Alamos | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| McNell Creek | Confluence with San Antonio Creek | Approximately 4,355 feet upstream of Chaparral Road | HEC-1 | HEC-2 | 1988 | AE w/ Floodway | |
| Medea Creek | Approximately 1,240 feet downstream of Conifer Street | Approximately 80 feet upstream of Kanan Road | HEC-1 | HEC-2 | 1988 | A | |
| Meier Canyon Creek | Confluence with Arroyo Simi | Approximately 3,745 feet upstream of confluence of South Meier Canyon | HEC-1 | HEC-2 | 1990 | A | |
| Mira Monte Drain | Confluence with Happy Valley Drain South | Approximately 1,300 feet upstream of Loma Drive | HEC-1 | HEC-2 | 1988 | AE | |
| Mission Drain | Confluence with Camarillo Hills Drain | Approximately 1,230 feet upstream of Glenbrook Avenue | VCRAT; HEC-HMS | FLO-2D | 2011 | AE | The hydrology was retained from the effective analysis. The original 100 year event hydrograph data was applied using inflow nodes in a 1D/2D hydraulic model in the flood route modeling software FLO-2D. |
| Moon Ditch | Confluence with Santa Clara River | At Railroad | HEC-1 | HEC-2 | 1983 | AE | |
| Moore Canyon | At county boundary | Approximately 1,190 feet upstream of county boundary | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Mud Canyon Creek | Confluence with Santa Paula Creek | Approximately 4,020 feet upstream of confluence with Santa Paula Creek | HEC-1 | HEC-2 | 1988 | A | |
| North Fork Canada De Los Alamos | At county boundary | Approximately 1,630 feet upstream of Forest Route 8N01 | HEC-1 | HEC-2 | 1988 | A | |
| North Ramona Place Drain | Confluence with Las Posas Estates Drain | Approximately 2,200 feet upstream of confluence with Las Posas Estates Drain | HEC-1 | HEC-2 | 1983 | A | |
| North Simi Drain | Confluence with Arroyo Simi | Approximately 3,200 feet upstream of Erringer Road | VCRAT | HEC-2 | 1995 | AE | |
| Nyland Drain | Confluence with Beardsley Wash | Approximately 1.5 miles upstream of confluence with Beardsley Wash | HEC-1 | HEC-2 | 1988 | A | |
| Oak Canyon Creek | Approximately 1,160 feet downstream of Highland Road | Approximately 730 feet upstream of Stonebrook Street | HEC-1 | HEC-2 | 1990 | A | |
| Oak Canyon Creek (North) | Confluence with Dry Canyon Creek | Approximately 700 feet upstream of confluence with Dry Canyon Creek | VCRAT | HEC-2 | 1990 | AE | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Oak Creek | Confluence with South Fork Canada De Los Alamos | Approximately 2 miles upstream of confluence with South Fork Canada De Los Alamos | HEC-1 | HEC-2 | 1988 | A | |
| Oak View Drain | Confluence with Ventura River | Approximately 50 feet upstream of East Oak View Avenue | HEC-1 | HEC-2 | 1988 | A | |
| Oleary Creek | Confluence with Santa Clara River | Approximately 225 feet upstream of Toland Road | HEC-1 | HEC-2 | 1988 | A | |
| Orcutt Canyon Creek | Confluence with Santa Clara River | Approximately 1,285 feet upstream of confluence of West Fork Orcutt Canyon | HEC-1 | HEC-2 | 1988 | A | |
| Oxnard West Drain | At Victoria Avenue | Approximately 2,015 feet upstream of Lido Boulevard | HEC-1 | HEC-2 | 1977 | A | The HEC-2 program (USACE, 1973) was used to evaluate the capacities. |
| Padre Juan Canyon Creek | At mouth | Approximately 1,080 feet upstream of State Route 1 | HEC-1 | HEC-2 | 1988 | A | |
| Palo Comado Canyon | County boundary | Approximately 1.7 miles upstream of Smoke Tree Avenue | HEC-1 | HEC-2 | 1988 | A | |
| Paso Flores Canyon | Confluence with Sand Canyon | Approximately 1,335 feet upstream of East Hackney Road | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Peach Hill Wash | Confluence with Arroyo Simi | Approximately 1,200 feet upstream of Country Hill Road | VCRAT 2.2 | HEC-2 | 2004; Revised 2008 | AE w/ Floodway | |
| Piedra Canyon | Confluence with Arroyo Simi | Approximately 345 feet upstream of Smith Road | HEC-1 | HEC-2 | 1988 | A | |
| Piru Creek | Confluence with Santa Clara River | Approximately 1,060 feet upstream of Southern Pacific Railroad | HEC-1 | HEC-2 | 1988 | AE w/ Floodway | |
| Piru Creek | Approximately 1,060 feet upstream of Southern Pacific Railroad | Santa Felicia Dam | HEC-1 | HEC-2 | 1988 | A | |
| Pole Creek | Approximately 2,400 feet upstream of confluence with Santa Clara River | Approximately 1,440 feet upstream of Blaine Street Extended | HEC-1 | HEC-2 | 1977 | AE w/ Floodway | |
| Pole Creek | Approximately 1,440 feet upstream of Blaine Street Extended | Approximately 2,670 feet upstream of Blaine Street Extended | HEC-1 | HEC-2 | 1977 | A | |
| Ponderosa Drain | Confluence with Camarillo Hills Drain | Approximately 1,575 feet upstream of Arneill Road | VCRAT; HEC-HMS | FLO-2D | 2011 | AE, AO | The hydrology was retained from the effective analysis. The original 100 year event hydrograph data was applied using inflow nodes in a 1D/2D hydraulic model in the flood route modeling software FLO-2D. |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Poplin Creek | Confluence with A Street Drain | Approximately 2,735 feet upstream of confluence of Poplin Creek Tributary | HEC-1 | HEC-2 | 1988 | A | |
| Poplin Creek Tributary | Confluence with Poplin Creek | Approximately 500 feet upstream of confluence with Poplin Creek | HEC-1 | HEC-2 | 1988 | A | |
| Puerta Zuela Barranca | Confluence with Coyote Canyon | Approximately 2,965 feet upstream of Donlon Road | HEC-1 | HEC-2 | 1988 | A | |
| Punte Gorda Canyon | At mouth | Approximately 615 feet upstream of U.S. Highway 1/ Ventura Freeway | HEC-1 | HEC-2 | 1988 | A | |
| Real Canyon | Confluence with Santa Clara River | Approximately 425 feet upstream of Center Street | HEC-1 | HEC-2 | 1988 | A | |
| Reasoner Canyon | Confluence with Lake Piru | Approximately 3,140 feet upstream of confluence with Lake Piru | HEC-1 | HEC-2 | 1988 | A | |
| Reeves Creek | Confluence with Thacher Creek | Approximately 3,800 feet upstream of McAndrew Road | HEC-1 | HEC-2 | 1988 | AE w/ Floodway | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Reeves Creek | Approximately 3,800 feet upstream of McAndrew Road | Approximately 2,100 feet upstream of Reeves Road | HEC-1 | HEC-2 | 1988 | A | |
| Reeves Creek Tributary | Confluence with Reeves Creek | Approximately 1,975 feet upstream of Topa Topa Ranch Road | HEC-1 | HEC-2 | 1988 | A | |
| Reimer Ditch | At Los Angeles Avenue | Approximately 640 feet upstream of South Sespe Street | HEC-1 | HEC-2 | 1988 | A | |
| Revolon Slough | Confluence with Calleguas Creek | Approximately 4,020 feet upstream of Hueneme Road | HEC-1 | HEC-2 | 1988 | AE | |
| Revolon Slough | Approximately 4,020 feet upstream of Hueneme Road | Confluence with Camarillo Hills Drain | HEC-1 | HEC-2 | 1988 | A | |
| Rincon Creek | Confluence with Pacific Ocean | Approximately 1,890 feet upstream of railroad | Log-Pearson Type III | HEC-2 | 1988 | AE w/ Floodway, AO | A regional flood frequency analysis was performed to determine the peak flood discharges of selected recurrence frequencies. The analysis was based on log-Pearson type III flood frequency distribution. To determine the distribution parameters for the ungagged Rincon Creek, six nearby coastal streams were selected to establish the regional equations. Gage statistics including mean and standard deviation for the selected nearby streams were computed using Bulletin 17B guidelines (U.S. Department of the Interior, 1982). The procedures used included adjusting the statistics of stations having discharges identified as low outliers. |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Rincon Creek, continued | Confluence with Pacific Ocean | Approximately 1,890 feet upstream of railroad | Log-Pearson Type III | HEC-2 | 1988 | AE w/ Floodway, AO | A regional skew coefficient of -0.2 was used (USACE, 1985). The calculated mean annual peak discharge versus drainage area and the calculated standard deviation versus drainage area were plotted and the least-square regression equations were derived fro mean annual peak discharge and standard deviations.<br>Flood elevations were computed using the USACE HEC_2 step-backwater computer program (USACE, February 1972). Starting water-surface elevations were determined assuming critical depth at the downstream section near the mouth. |
| Rincon Creek | Approximately 1,890 feet upstream of railroad | Approximately 40 feet upstream of State Route 150 | Log-Pearson Type III | HEC-2 | 1988 | A | |
| Runckle Canyon | Confluence with Arroyo Simi | Approximately 450 feet upstream of Runkle Haul Road | HEC-1 | HEC-2 | 1990 | A, AH | |
| Salt Canyon | Confluence with Santa Clara River | Approximately 1 mile upstream of confluence with Santa Clara River | HEC-1 | HEC-2 | 1988 | A | |
| San Antonio Creek | Confluence with Ventura River | Approximately 1,695 feet upstream of Hermitage Road | HEC-1 | HEC-2 | 1988 | AE w/ Floodway | Alluvial fan methodologies were applied to calculate flow depths and velocities in portions of the creek (David R. Dawdy, 1979).<br>Starting water-surface elevations were taken from the profile used in the Floodplain Information report (USACE, 1973). |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Sand Canyon | Confluence with Arroyo Las Posas | Approximately 1.3 miles upstream of confluence of Paso Flores Canyon | HEC-1 | HEC-2 | 1988 | A | |
| Santa Ana Creek | Confluence with A Street Drain | Approximately 1.2 miles upstream of Santa Ana Road | HEC-1 | HEC-2 | 1988 | A | |
| Santa Ana Creek Tributary | Confluence with Santa Ana Creek | Approximately 210 feet upstream of Santa Ana Road | HEC-1 | HEC-2 | 1988 | A | |
| Santa Clara River | Approximately 2,290 feet downstream of Harbor Boulevard | Approximately 1.7 miles upstream of Del Rio | Log-Pearson Type III | HEC-2 | 1983 | AE w/ Floodway | Flood discharges were obtained from hydrology reports prepared by the USACE for use in floodplain information, flood insurance, and special flood hazard studies (USACE, April 1973; USACE, February 1977).<br>Water-surface elevations for the selected recurrence intervals were computed through use of the USACE HEC-2 step-backwater computer program (USACE, February 1972).<br>Starting water-surface elevations were taken from a USACE floodplain report (USACE, 1968). |
| Santa Clara River Breakout | Approximately 3,880 feet downstream of Harbor Boulevard | Confluence with Santa Clara River | HEC-1 | HEC-2 | 1988 | AE w/ Floodway | |
| Santa Felicia Creek | Confluence with Lake Piru | County boundary | HEC-1 | HEC-2 | 1988 | A | |
| Santa Felicia Spillway | Confluence with Piru Creek | At Santa Felicia Dam | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Santa Paula Creek | Confluence with Santa Clara River | Approximately 1.6 miles downstream of Rafferty Road | HEC-1 | HEC-2 | 1988 | A, A99 | |
| Santa Paula Creek | Approximately 1.6 miles downstream of Rafferty Road | Approximately 360 feet upstream of Steckel Park Road | Log-Pearson Type III | HEC-2 | 1983 | AE | Flood discharges were obtained from hydrology reports prepared by the USACE for use in floodplain information, flood insurance, and special flood hazard studies (USACE, April 1973; USACE, February 1977).<br>Santa Paula Creek was studied using normal-depth calculations, historical observations, engineering judgement, and partial use of the HEC-2 computer program (USACE, October 1973). |
| Santa Paula Creek | Approximately 360 feet upstream of Steckel Park Road | Approximately 4,535 feet upstream of confluence of Sisar Creek | HEC-1 | HEC-2 | 1983 | A | |
| Santa Rosa East Tributary | Approximately 420 feet upstream of Santa Rosa Bridge | Approximately 650 feet upstream of Marvella Court | HEC-1 | HEC-2 | 1988 | A | |
| Serrano Canyon | Confluence with Big Sycamore Canyon Creek | Approximately 1,865 feet upstream of confluence with Big Sycamore Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |
| Sespe Creek | Confluence with Santa Clara River | Approximately 4,690 feet downstream of Old Telegraph Road | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Sespe Creek | Approximately 4,690 feet downstream of Old Telegraph Road | Approximately 3.5 miles upstream of Old Telegraph Road | HEC-1 | HEC-2 | 1988 | AE w/ Floodway | The original hydrologic study (USACE, 1973) used in preparation of the USACE's Flood Plain Information report provided peak discharges for the hydraulic analysis.<br>An effective flow HEC-2 model was developed using the width of the floodplain that included both east and west channels. This model provided a 1-percent-annual-chance profile consistent with the 1-percent-annual-chance profile in the USACE Flood Plain Information report (USACE, June 1972). |
| Sespe Creek | Approximately 3.5 miles upstream of Old Telegraph Road | Approximately 4.8 miles upstream of Old Telegraph Road | HEC-1 | HEC-2 | 1988 | A | |
| Shekell Road Drain | Confluence with South Grimes Canyon Wash | Approximately 1,550 feet upstream of Grimes Canyon Road | HEC-1 | HEC-2 | 1988 | A | |
| Sherwood Creek | Confluence with Lake Sherwood | Approximately 370 feet upstream of East Carlisle Road | HEC-1 | HEC-2 | 1988 | A | |
| Shields Canyon | Approximately 1,450 feet upstream of confluence with Santa Clara River | At Guiberson Road | HEC-1 | HEC-2 | 1988 | A | |
| Sisar Creek | Confluence with Santa Paula Creek | Approximately 2,560 feet upstream of confluence of Koenigstein Road Wash | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Smith Canyon | Confluence with Santa Clara River | Approximately 880 feet upstream of East Guiberson Road | HEC-1 | HEC-2 | 1988 | A | |
| Solano Verde Wash | Confluence with Coyote Canyon | Approximately 90 feet upstream of Solano Verde Drive | HEC-1 | HEC-2 | 1988 | A | |
| Somis Drain | Confluence with Calleguas Creek | At Las Posas Road | VCRAT; HEC-HMS | FLO-2D | 2011 | AE, AO | The hydrology was retained from the effective analysis. The original 100 year event hydrograph data was applied using inflow nodes in a 1D/2D hydraulic model in the flood route modeling software FLO-2D. |
| South Branch Arroyo Conejo | Confluence with Arroyo Conejo | At Ventu Park Road | HEC-1 | HEC-2 | 1976 | A | |
| South Branch Arroyo Conejo | At Ventu Park Road | Approximately 190 feet upstream of Portero Road | HEC-1 | HEC-2 | 1976 | AE | |
| South Branch Arroyo Conejo | Approximately 190 feet upstream of Portero Road | Approximately 0.5 miles upstream of Sycamore Canyon Road | HEC-1 | HEC-2 | 1976 | A | |
| South Fork Canada De Los Alamos | At county boundary | Approximately 2,250 feet upstream of confluence of Maxy Canyon | HEC-1 | HEC-2 | 1988 | A | |
| South Grimes Canyon Wash | Approximately 600 feet upstream of confluence with Arroyo Las Posas | Approximately 2,255 feet upstream of Turfway Road | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| South Grimes Canyon Wash (North) | At Ojai Street | Approximately 2,840 feet upstream of Bardsdale Avenue | HEC-1 | HEC-2 | 1988 | A | |
| South Grimes Canyon Wash Tributary | Confluence with South Grimes Canyon Wash | Approximately 1,845 feet upstream of confluence with South Grimes Canyon Wash | HEC-1 | HEC-2 | 1988 | A | |
| Stewart Canyon Creek | Confluence with San Antonio Creek | Approximately 1,460 feet upstream of McKee Street | HEC-1 | HEC-2 | 1977 | AE w/ Floodway | |
| Sulphur Canyon | Confluence with Canada Larga | Approximately 260 feet upstream of Canada Larga Road | HEC-1 | HEC-2 | 1988 | A | |
| Sycamore Canyon | Confluence with Arroyo Simi | At East Bonita Drive | HEC-1 | HEC-2 | 1990 | AO | |
| Sycamore Canyon | Sycamore Canyon Dam | Approximately 3,000 feet upstream of Sycamore Canyon Dam | HEC-1 | HEC-2 | 1990 | AE | |
| Sycamore Creek | Confluence with Lion Canyon Creek | Approximately 1,215 feet upstream of Highwinds Road | HEC-1 | HEC-2 | 1988 | A | |
| Tapo Canyon Channel | Confluence with Arroyo Simi | Approximately 685 feet upstream of Simi Valley Freeway | VCRAT | HEC-2 | 1995 | AE, AH | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Tapo Canyon Channel | Approximately 685 feet upstream of Simi Valley Freeway | Approximately 320 feet upstream of Walnut Avenue | VCRAT | HEC-2 | 1995 | A | |
| Tapo Canyon Channel | Approximately 320 feet upstream of Walnut Avenue | Approximately 2,110 feet upstream of Walnut Avenue | VCRAT | HEC-2 | 1995 | AE | |
| Tapo Canyon Creek | Confluence with Tapo Canyon Channel | Approximately 1,340 feet upstream of confluence of Tripas Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |
| Tapo Canyon Creek (North) | Confluence with Santa Clara River | Approximately 450 feet upstream of East Tributary Tapo Canyon | HEC-1 | HEC-2 | 1988 | A | |
| Tapo Canyon Tributary | Confluence with Tapo Canyon Creek | Approximately 290 feet upstream of Tapo Canyon Road | HEC-1 | HEC-2 | 1988 | A | |
| Thacher Creek | Confluence with San Antonio Creek | Approximately 245 feet upstream of confluence of Reeves Creek | HEC-1 | HEC-2 | 1988 | AE w/ Floodway | Alluvial fan methodologies were applied to calculate flow depths and velocities in portions of the creek (David R. Dawdy, 1979).<br>Starting water-surface elevations were taken from the profile used in the Floodplain Information report (USACE, 1973). |
| Thacher Creek | Approximately 245 feet upstream of confluence of Reeves Creek | Approximately 490 feet upstream of Grand Avenue | HEC-1 | HEC-2 | 1988 | AO | Alluvial fan methodologies were applied to calculate flow depths and velocities in portions of the creek (David R. Dawdy, 1979). |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Thacher Creek | Approximately 490 feet upstream of Grand Avenue | Approximately 2,015 feet upstream of Thacher Road | HEC-1 | HEC-2 | 1988 | AE w/ Floodway | Alluvial fan methodologies were applied to calculate flow depths and velocities in portions of the creek (David R. Dawdy, 1979). |
| Thousand Oaks North Drain | Confluence with Arroyo Conejo | Approximately 810 feet upstream of El Cerrito Drive | VCRAT 2.2 | HEC-2 | 2004 | AE | |
| Tierra Rejada Creek | Confluence with Arroyo Santa Rosa | Approximately 1.1 miles upstream of confluence with Arroyo Santa Rosa | HEC-1 | HEC-2 | 1988 | A | |
| Timber Canyon | Confluence with Santa Clara River | Approximately 2.6 miles upstream of confluence of Boosey Canyon | HEC-1 | HEC-2 | 1988 | A | |
| Todd Barranca | Confluence with Santa Clara River | Approximately 930 feet upstream of confluence of Wheeler Canyon West Fork | HEC-1 | HEC-2 | 1988 | A | |
| Torey Canyon | Confluence with Santa Clara River | Approximately 1,465 feet upstream of East Guiberson Road | HEC-1 | HEC-2 | 1988 | A | |
| Tripas Canyon Creek | Confluence with Tapo Canyon Creek | Approximately 2,630 feet upstream of confluence with Tapo Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Tripas Canyon Tributary | Approximately 215 feet upstream of Tripps Canyon Road | Approximately 1.1 miles upstream of Tripps Canyon Road | HEC-1 | HEC-2 | 1988 | A | |
| Valley Road Wash | Confluence with Hidden Valley Wash | Approximately 2,500 feet upstream of Valley Road | HEC-1 | HEC-2 | 1988 | A | |
| Ventura River | Mouth at Pacific Ocean | Approximately 4,650 feet upstream of Camino Cielo Road | HEC-1 | HEC-2 | 1984 | AE w/ Floodway | Flow rates were obtained from a USACE hydrology report (USACE, December 1970). |
| Walnut Canyon Drain | Confluence with Gabbert Canyon Creek | Approximately 4,100 feet upstream of High Street | VCRAT 2.2 | HEC-RAS 3.1 | 2004 | AE | |
| Warring Canyon Creek | Confluence with Real Canyon | Approximately 2,760 feet upstream of Center Street | HEC-1 | HEC-2 | 1988 | A | |
| Warring Wash | Confluence with Santa Clara River | Approximately 2,030 feet upstream of Pacific Avenue | HEC-1 | HEC-2 | 1988 | A | |
| West Camarillo Hills Tributary | Confluence with Camarillo Hills Drain | At Las Posas Road | VCRAT; HEC-HMS | FLO-2D | 2011 | AE, AO | The hydrology was retained from the effective analysis. The original 100 year event hydrograph data was applied using inflow nodes in a 1D/2D hydraulic model in the flood route modeling software FLO-2D. |
| West Fifth Street Drain | Confluence with E Street Drain | At South Patterson Road | HEC-1 | HEC-2 | 1977 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| West Fork Medea Creek | Confluence with Medea Creek | Approximately 4,110 feet upstream of confluence with Medea Creek | HEC-1 | HEC-2 | 1988 | A | |
| West Fork Orcutt Canyon | Confluence with Orcutt Canyon Creek | Approximately 380 feet upstream of confluence with Orcutt Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |
| West Fork Salt Canyon | At county boundary | Approximately 1,260 feet upstream of confluence of West Fork Salt Canyon Tributary | HEC-1 | HEC-2 | 1988 | A | |
| West Fork Salt Canyon Tributary | Confluence with West Fork Salt Canyon | At county boundary | HEC-1 | HEC-2 | 1988 | A | |
| West Tributary Long Canyon | Confluence with Long Canyon Creek | Approximately 1,525 feet upstream of Stockdon Road | HEC-1 | HEC-2 | 1988 | A | |
| West Wooley Drain | Confluence with Oxnard West Drain | Approximately 1,950 feet upstream of confluence of Oxnard West Drain | HEC-1 | HEC-2 | 1977 | A | |
| White Oak Creek | Confluence with Arroyo Simi | Approximately 2,525 feet upstream of Ziegler Drive | VCRAT | HEC-2 | 1993 | A | |

## Table 13: Summary of Hydrologic and Hydraulic Analyses, continued

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| White Oak Tributary | Confluence with White Oak Creek | Approximately 980 feet upstream of confluence with White Oak Creek | VCRAT | HEC-2 | 1993 | A | |
| Windmill Canyon | Confluence with Gillibrand Canyon Creek | Approximately 945 feet upstream of Windmill Canyon Road | HEC-1 | HEC-2 | 1988 | A | |
| Windmill Canyon Tributary | Confluence with Windmill Canyon | Approximately 790 feet upstream of confluence with Windmill Canyon | HEC-1 | HEC-2 | 1988 | A | |
| Wood Canyon | Confluence with Big Sycamore Canyon Creek | Approximately 3,220 feet upstream of confluence with Big Sycamore Canyon Creek | HEC-1 | HEC-2 | 1988 | A | |
| Wood Ranch Reservoir | Ward Circle | Ward Circle | HEC-1 | HEC-2 | 1988 | A | |

**Table 14: Roughness Coefficients**

| Flooding Source | Channel "n" | Overbank "n" |
|---|---|---|
| Adams Canyon | 0.060 | * |
| Arundell Barranca | 0.015 | 0.030 |
| Arroyo Simi | 0.015 – 0.120 | * |
| Barlow Barranca | 0.024 | * |
| Brown Barranca | 0.015 – 0.030 | 0.050 |
| Calleguas Creek | 0.030 – 0.035 | 0.040 – 0.090 |
| Camarillo Hills Drain | 0.030 – 0.060 | 0.030 – 0.040 |
| City of Camarillo Spill | 0.15 | 0.15 |
| Conejo Creek | 0.025 – 0.030 | 0.15 |
| Edgemore Drain | 0.030 – 0.036 | 0.035 – 0.221 |
| Fagan Canyon | 0.014 | 0.035 |
| Fox Canyon Storm Drain | 0.015 – 0.035 | 0.020 – 0.060 |
| Franklin Barranca | 0.015 | 0.030 – 0.100 |
| Harmon Barranca | 0.040 | 0.070 |
| Las Posas Estates Drain | 0.015 – 0.050 | 0.040 – 0.070 |
| Mills Road Drain | 0.015 | * |
| Mission Drain | 0.030 – 0.043 | 0.035 – 0.221 |
| Pole Creek | 0.015 – 0.040 | 0.040 – 0.070 |
| Rincon Creek | 0.012 – 0.125 | 0.060 – 0.150 |
| San Antonio Creek | 0.032 – 0.036 | 0.030 – 0.043 |
| Santa Clara River | 0.025 – 0.030 | 0.040 – 0.070 |
| Santa Paula Creek | 0.035 | * |
| Sespe Creek | 0.060 | 0.070 |
| Somis Drain | 0.030 – 0.045 | 0.035 – 0.221 |
| Stewart Canyon Storm Channel | 0.015 – 0.040 | 0.040 |
| Telephone Road Drain | 0.015 | * |
| Thacher Creek | 0.030 – 0.035 | 0.020 – 0.035 |
| Ventura River | 0.025 – 0.040 | 0.040 – 0.050 |
| West Camarillo Hills Tributary | 0.030 – 0.039 | 0.035 – 0.221 |

*Data not available

## 5.3 Coastal Analyses

For the areas of Ventura County that are impacted by coastal flooding processes, coastal flood hazard analyses were performed to provide estimates of coastal BFEs. Coastal BFEs reflect the increase in water levels during the 1% annual chance flood event due to high tides, storm surge, and wave effects.

The following subsections provide summaries of how each coastal process was considered for this FIS Report. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation. Table 15 summarizes the methods and/or models used for the coastal analyses. Refer to Section 2.5.1 for descriptions of the terms used in this section.

**Table 15: Summary of Coastal Analyses**

| Flooding Source | Study Limits From | Study Limits To | Hazard Evaluated | Model or Method Used | Date Analysis was Completed |
|---|---|---|---|---|---|
| Pacific Ocean | Entire coastline of Ventura County | Entire coastline of Ventura County | Wave Setup and Runup | FEMA Pacific Guidelines 2005, Stockdon/DIM, TAW | 04/01/2015 |
| Pacific Ocean | Entire coastline of Ventura County | Entire coastline of Ventura County | SWEL[1] | Tide Frequency Analysis | 04/01/2015 |
| Pacific Ocean | Entire coastline of Ventura County | Entire coastline of Ventura County | Dune Erosion | FEMA Pacific Guidelines 2005, MK&A; Kriebel and Dean | 04/01/2015 |
| Pacific Ocean | Entire coastline of Ventura County | Entire coastline of Ventura County | Wave Overtopping | FEMA Pacific Guidelines 2005, Cox-Machemehl | 04/01/2015 |
| Pacific Ocean | Entire coastline of Ventura County | Entire coastline of Ventura County | Harbor Analysis | FEMA Pacific Guidelines 2005, Penney and Price, Wiegel | 04/01/2015 |

[1]The stillwater elevation (SWEL) refers to the statistically determined constant flood elevation

### 5.3.1 Total Stillwater Elevations

Total stillwater elevations were not analyzed in Ventura County and are not typically analyzed along the Pacific coast. In Ventura County, coastal BFE were ultimately determined from TWL. The TWL for the 1% annual chance event were determined for areas subject to coastal flooding. The models and methods that were used to determine storm surge and wave setup are listed in Table 15. The TWL that was calculated for each transect during the coastal analyses is shown in

Table 17, "Coastal Transect Parameters." Figure 8 shows the TWL for the 1% annual chance event that was determined for this coastal analysis.

**Figure 8: 1% Annual Chance Total Water Levels for Coastal Areas (feet NAVD88)**


### Astronomical Tide

Water level data were obtained from the NOAA National Ocean Service (NOS) tide gage network, which includes multiple gages along the California coast. The observed tide records were assumed to include all components of the SWL, including astronomical tides and storm surge.

### Storm Surge

Storm surge magnitudes were obtained from the NOAA NOS historical observed tide gage records. Although the observed tide records along the coast are mostly complete, there are some spatial and temporal gaps. Temporal gaps in the records were filled using an approach that applied the statistical relationships of observed non-tidal residuals between adjacent tide gages to estimate the non-tidal residual components at stations with missing data. Using these statistical correlations and an understanding of the spatial variability of regional storms, the gaps in the tide station records were empirically reconstructed to provide a continuous hourly time series of stillwater levels for the 1960-2009 hindcast period at each tide gage in the open Pacific coast study area. SWL time series were subsequently evaluated for observed sea level trends and adjusted to the current national Datum Epoch of 1983-2001.

Once the hourly SWL hindcast was reconstructed at each tide gage, the reconstructed time series were applied along spatially homogeneous reaches of the coastline. For some open Pacific coastal reaches, it was determined that the nearest long-term tide station did not adequately represent the local tidal characteristics due to smaller-scale effects in the region. For these reaches, the predicted tides from short-term subordinate stations were combined with the reconstructed non-tidal residual time series from the long-term stations to produce a representative SWL hindcast.

Table 16 provides the gage name, managing agency, gage type, gage identifier, start date, end date, and statistical methodology applied to each gage used to determine the 1% annual chance SWEL.

**Table 16: Tide Gage Analysis Specifics**

| Gage Name | Managing Agency of Tide Gage Record | Gage Type | Start Date | End Date | Statistical Methodology |
|---|---|---|---|---|---|
| Santa Barbara (9411340) | NOAA | Tide | 02/26/1974 | 12/31/2009 | GEV |
| Santa Monica (9410840) | NOAA | Tide | 11/25/1973 | 12/31/2009 | GEV |

### 5.3.2 Waves

The SWL were combined with calculated wave setup and runup heights to determine TWL at each analysis transect. The initial modeling of the offshore and nearshore wave climates within the study area was a critical component to the analysis. To provide adequate wave input data for the 1-D transect-based TWL analyses, Oceanweather Inc. developed a continuous 50-year hourly deepwater wave hindcast for the period of January 1, 1960 to December 31, 2009 along the California coastline (OWI, 2009). The wave modeling consisted of three nested model grids of sequentially higher resolution to resolve the wave conditions at varying spatial scales. These included the basin (global), regional (Northeast Pacific Ocean), and coastal (California) grids.

The deep-water wave characteristics were subsequently transformed to nearshore wave characteristics at the edge of the surf zone in approximately 49 feet water depth. The nearshore wave transformation modeling was conducted by the Scripps Institute of Oceanography (SIO) Coastal Data iNformation Program (CDIP) research group in collaboration with BakerAECOM using the SIO SHELF model (SIO, 2014). In select localized areas of complex shoreline geometry, wave data were also provided at 16 and 33 feet water depth. The output nearshore wave characteristics from this wave transformation model provided the input conditions for the 1-D transect-based wave setup and runup calculations.

### 5.3.3 Coastal Erosion

A single storm episode can cause extensive erosion in coastal areas. Storm-induced dune erosion was evaluated to determine the modification to existing coastal dune topography that is expected

with the 1% annual chance flood events. Dune erosion was analyzed using the methods listed in Table 15.

### 5.3.4 Wave Hazard Analyses

This section is not applicable to this Flood Risk Project as no overland wave propagation analysis was conducted in this county.

**Table 17: Coastal Transect Parameters**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 11N) | | Total Water Level (feet NAVD88) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 1 | 272624.7616 | 3805452.7606 | 11.6 | 12.1 | 12.4 | 12.8 | 13.7 |
| Pacific Ocean | 2 | 273079.0047 | 3805472.5692 | 26.6 | 28.8 | 30.6 | 32.5 | 37.2 |
| Pacific Ocean | 3 | 274034.4909 | 3804661.0162 | 13.1 | 13.8 | 14.3 | 14.9 | 16.3 |
| Pacific Ocean | 4 | 274558.0134 | 3803955.9142 | 14.2 | 15.0 | 15.6 | 16.2 | 17.6 |
| Pacific Ocean | 5 | 275560.4268 | 3803292.3674 | 22.9 | 25.1 | 27.1 | 29.3 | 35.7 |
| Pacific Ocean | 6 | 275812.2304 | 3803159.9435 | 15.2 | 16.9 | 18.3 | 20.0 | 25.0 |
| Pacific Ocean | 7 | 276513.9201 | 3802500.1166 | 26.9 | 29.0 | 30.8 | 32.6 | 37.4 |

**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 8 | 277172.3664 | 3801834.3919 | 26.3 | 29.1 | 31.5 | 34.4 | 42.8 |
| Pacific Ocean | 9 | 277989.1307 | 3801108.4631 | 24.2 | 26.4 | 28.2 | 30.0 | 34.4 |
| Pacific Ocean | 10 | 278595.5847 | 3800545.9211 | 20.3 | 22.5 | 24.3 | 26.0 | 30.4 |
| Pacific Ocean | 11 | 279757.2062 | 3799665.9348 | 30.5 | 33.0 | 34.9 | 36.8 | 41.3 |
| Pacific Ocean | 12 | 280013.6506 | 3799599.5468 | 15.2 | 18.4 | 21.7 | 26.0 | 42.4 |
| Pacific Ocean | 13 | 280413.8244 | 3799570.6173 | 18.3 | 19.4 | 20.2 | 21.0 | 23.0 |
| Pacific Ocean | 14 | 280826.0459 | 3799560.3618 | 22.4 | 23.8 | 24.9 | 26.1 | 29.0 |
| Pacific Ocean | 15 | 281265.2085 | 3799549.436 | 18.3 | 19.4 | 20.3 | 21.3 | 23.9 |

**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 16 | 281320.0839 | 3799548.0708 | 17.7 | 20.0 | 21.9 | 24.1 | 30.6 |
| Pacific Ocean | 17 | 281474.0618 | 3799533.1475 | 18.8 | 20.7 | 22.5 | 24.5 | 30.6 |
| Pacific Ocean | 18 | 281739.6002 | 3799239.8456 | 21.2 | 24.0 | 26.3 | 28.9 | 36.1 |
| Pacific Ocean | 19 | 281958.8759 | 3798901.9954 | 19.7 | 22.4 | 24.9 | 27.6 | 35.9 |
| Pacific Ocean | 20 | 282400.7017 | 3798310.5525 | 19.3 | 21.9 | 24.3 | 27.3 | 36.8 |
| Pacific Ocean | 21 | 282581.3613 | 3798096.3734 | 15.7 | 16.7 | 17.6 | 18.5 | 21.1 |
| Pacific Ocean | 22 | 282701.5291 | 3797958.4099 | 16.1 | 17.2 | 18.1 | 19.1 | 21.7 |
| Pacific Ocean | 23 | 282838.0155 | 3797801.4837 | 14.7 | 15.9 | 16.9 | 18.1 | 21.3 |

**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 24 | 283359.2143 | 3797199.6994 | 16.6 | 17.7 | 18.6 | 19.6 | 22.1 |
| Pacific Ocean | 25 | 283970.1128 | 3796489.8588 | 15.1 | 16.4 | 17.4 | 18.7 | 22.2 |
| Pacific Ocean | 26 | 284474.6092 | 3796014.9407 | 15.0 | 17.1 | 18.9 | 21.0 | 27.2 |
| Pacific Ocean | 27 | 285438.0339 | 3795269.6714 | 21.6 | 23.1 | 24.4 | 25.7 | 29.3 |
| Pacific Ocean | 28 | 285641.303 | 3795124.3757 | 13.9 | 16.7 | 19.6 | 23.6 | 39.1 |
| Pacific Ocean | 29 | 286122.9472 | 3794795.4284 | 21.8 | 23.1 | 24.2 | 25.2 | 27.8 |
| Pacific Ocean | 30 | 287346.6973 | 3794089.866 | 17.9 | 19.4 | 20.6 | 22.0 | 26.1 |
| Pacific Ocean | 31 | 288401.7078 | 3793859.6492 | 10.2 | 10.6 | 11.0 | 11.4 | 12.6 |

**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 32 | 288918.9608 | 3793710.479 | 10.0 | 10.3 | 10.5 | 10.8 | 11.4 |
| Pacific Ocean | 33 | 288746.047 | 3793779.5653 | 15.4 | 16.4 | 17.3 | 18.2 | 20.7 |
| Pacific Ocean | 34 | 288624.6721 | 3793818.5462 | 15.0 | 15.7 | 16.3 | 16.8 | 18.2 |
| Pacific Ocean | 35 | 288789.4134 | 3793763.8439 | 13.7 | 14.5 | 15.1 | 15.7 | 17.1 |
| Pacific Ocean | 36 | 288992.1816 | 3793675.7366 | 19.0 | 20.2 | 21.2 | 22.2 | 24.8 |
| Pacific Ocean | 37 | 289182.984 | 3793567.8175 | 15.5 | 16.3 | 17.0 | 17.7 | 19.6 |
| Pacific Ocean | 38 | 289465.1029 | 3793352.8935 | 16.7 | 17.7 | 18.5 | 19.3 | 21.5 |
| Pacific Ocean | 39 | 289692.5245 | 3793112.1129 | 14.1 | 14.8 | 15.4 | 16.0 | 17.5 |

**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 40 | 289844.4227 | 3792897.1788 | 15.8 | 16.8 | 17.6 | 18.4 | 20.6 |
| Pacific Ocean | 41 | 290015.6865 | 3792554.6587 | 15.4 | 16.3 | 16.9 | 17.6 | 19.1 |
| Pacific Ocean | 42 | 290065.8634 | 3792411.1437 | 11.6 | 12.4 | 13.2 | 14.0 | 16.3 |
| Pacific Ocean | 43 | 290736.9381 | 3791879.7198 | 7.6 | 8.2 | 8.7 | 9.4 | 11.8 |
| Pacific Ocean | 44 | 290202.3734 | 3791421.805 | 17.6 | 18.6 | 19.4 | 20.2 | 22.1 |
| Pacific Ocean | 45 | 290752.7763 | 3788552.6774 | 17.0 | 17.9 | 18.6 | 19.4 | 21.1 |
| Pacific Ocean | 46 | 291024.2479 | 3787792.9834 | 17.0 | 17.9 | 18.6 | 19.3 | 21.0 |
| Pacific Ocean | 47 | 291863.6111 | 3786301.8344 | 17.8 | 18.7 | 19.4 | 20.1 | 21.8 |

**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 48 | 292696.8445 | 3785383.2658 | 18.0 | 19.0 | 19.8 | 20.6 | 22.5 |
| Pacific Ocean | 49 | 292847.2128 | 3784910.0687 | 17.6 | 18.6 | 19.3 | 20.1 | 22.0 |
| Pacific Ocean | 50 | 292887.387 | 3784466.9628 | 18.6 | 19.7 | 20.5 | 21.3 | 23.2 |
| Pacific Ocean | 51 | 293026.5693 | 3783650.4597 | 16.5 | 17.2 | 17.8 | 18.3 | 19.6 |
| Pacific Ocean | 52 | 293236.2173 | 3782888.6018 | 15.3 | 16.0 | 16.5 | 17.1 | 18.2 |
| Pacific Ocean | 53 | 293755.3377 | 3781652.4243 | 8.0 | 8.8 | 9.7 | 10.8 | 14.9 |
| Pacific Ocean | 54 | 294314.1676 | 3780775.8496 | 18.9 | 19.9 | 20.7 | 21.5 | 23.1 |
| Pacific Ocean | 55 | 294663.9336 | 3780388.2763 | 20.9 | 22.1 | 23.1 | 24.0 | 26.3 |

**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 56 | 294735.7844 | 3780318.1158 | 16.2 | 16.9 | 17.5 | 18.1 | 19.4 |
| Pacific Ocean | 57 | 295811.8414 | 3779536.1969 | 12.3 | 12.8 | 13.2 | 13.6 | 14.4 |
| Pacific Ocean | 58 | 295280.3332 | 3779867.0683 | 12.9 | 13.5 | 14.1 | 14.6 | 16.1 |
| Pacific Ocean | 59 | 296628.6331 | 3779202.7749 | 13.8 | 14.1 | 14.4 | 14.6 | 15.0 |
| Pacific Ocean | 60 | 296664.8456 | 3779192.3547 | 13.3 | 13.6 | 13.9 | 14.1 | 14.6 |
| Pacific Ocean | 61 | 296815.849 | 3779146.9256 | 20.7 | 21.3 | 21.7 | 22.0 | 22.7 |
| Pacific Ocean | 62 | 297424.1556 | 3778906.1347 | 17.2 | 17.6 | 17.9 | 18.1 | 18.5 |
| Pacific Ocean | 63 | 299092.6078 | 3777677.6492 | 14.8 | 15.2 | 15.4 | 15.7 | 16.2 |

**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 64 | 299764.8178 | 3777091.7866 | 13.9 | 14.4 | 14.7 | 15.1 | 15.7 |
| Pacific Ocean | 65 | 300802.3659 | 3776187.5149 | 14.7 | 15.1 | 15.4 | 15.6 | 16.2 |
| Pacific Ocean | 66 | 301248.6376 | 3775811.9047 | 16.4 | 16.8 | 17.0 | 17.3 | 17.7 |
| Pacific Ocean | 67 | 302127.1916 | 3775272.7579 | 16.4 | 17.0 | 17.4 | 17.8 | 18.6 |
| Pacific Ocean | 68 | 302792.7197 | 3774996.6538 | 16.8 | 17.7 | 18.4 | 19.1 | 20.7 |
| Pacific Ocean | 69 | 303515.9662 | 3774812.9603 | 12.5 | 13.3 | 14.0 | 14.8 | 17.1 |
| Pacific Ocean | 70 | 304382.712 | 3774737.6264 | 14.6 | 15.0 | 15.3 | 15.5 | 16.0 |
| Pacific Ocean | 71 | 304995.3509 | 3774725.1635 | 17.9 | 18.8 | 19.4 | 19.9 | 21.3 |

**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 72 | 305627.5121 | 3774711.3099 | 18.4 | 19.0 | 19.5 | 19.9 | 20.8 |
| Pacific Ocean | 73 | 306044.0537 | 3774738.4857 | 15.7 | 16.6 | 17.3 | 18.1 | 20.1 |
| Pacific Ocean | 74 | 306273.9239 | 3774776.9685 | 13.8 | 16.5 | 19.4 | 23.5 | 40.3 |
| Pacific Ocean | 75 | 306441.4876 | 3774781.428 | 16.2 | 17.1 | 17.8 | 18.5 | 20.1 |
| Pacific Ocean | 76 | 306644.8674 | 3774766.4227 | 24.3 | 25.2 | 25.8 | 26.3 | 27.2 |
| Pacific Ocean | 77 | 307860.8239 | 3774114.892 | 14.6 | 15.5 | 16.2 | 16.9 | 18.6 |
| Pacific Ocean | 78 | 308881.3486 | 3773418.7336 | 19.7 | 20.8 | 21.6 | 22.4 | 24.4 |
| Pacific Ocean | 79 | 310144.0416 | 3772865.6117 | 14.1 | 16.3 | 18.6 | 21.7 | 33.8 |

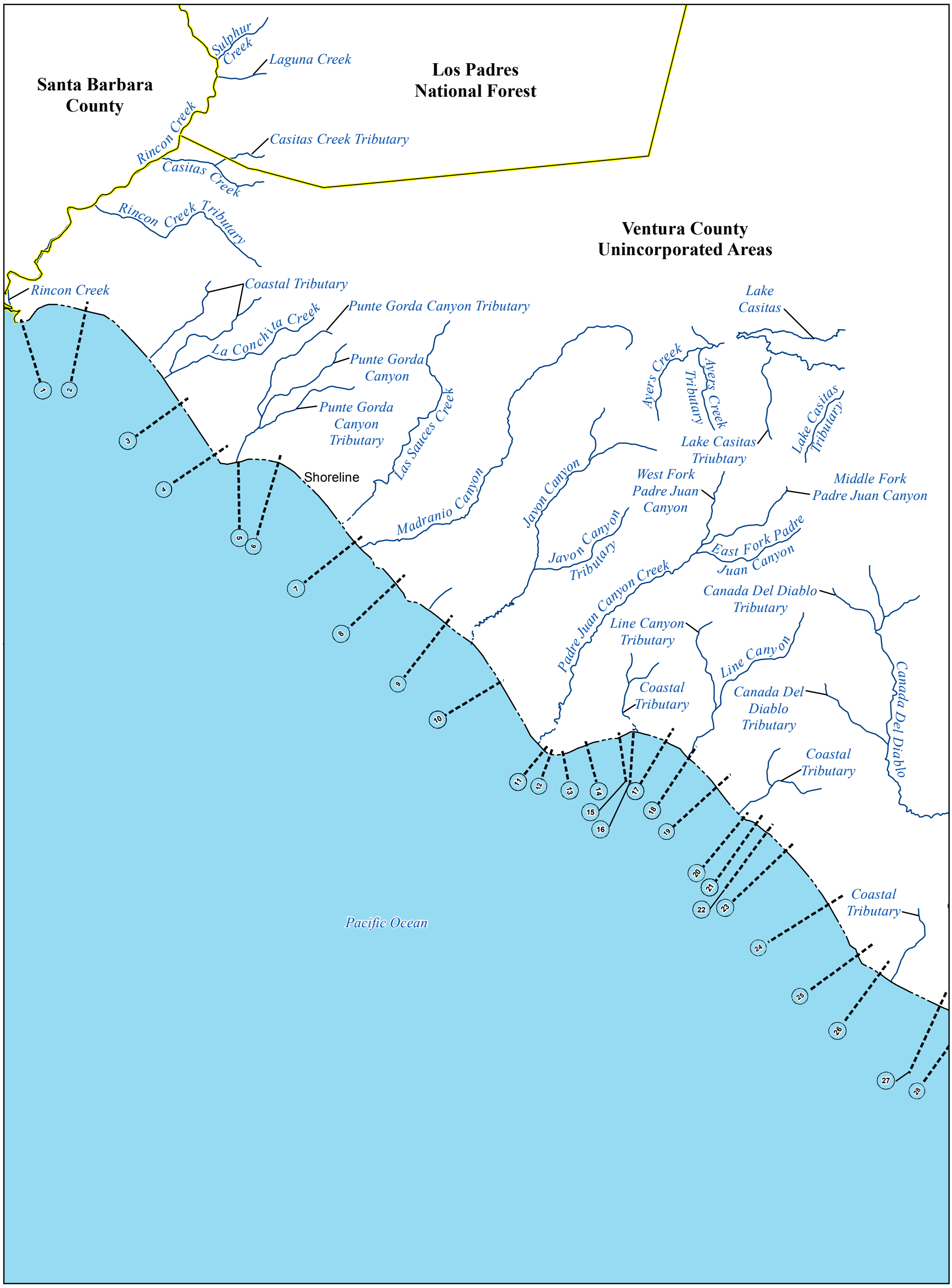
**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 80 | 311397.2331 | 3772656.8814 | 28.7 | 31.1 | 33.0 | 35.1 | 40.4 |
| Pacific Ocean | 81 | 312039.1358 | 3772430.4351 | 23.8 | 24.7 | 25.3 | 25.9 | 27.1 |
| Pacific Ocean | 82 | 313171.8156 | 3771666.571 | 14.4 | 16.2 | 18.0 | 20.2 | 27.7 |
| Pacific Ocean | 83 | 313818.4028 | 3771351.158 | 20.4 | 21.2 | 21.8 | 22.3 | 23.5 |
| Pacific Ocean | 84 | 315816.2447 | 3770552.616 | 20.0 | 22.6 | 24.9 | 27.7 | 36.1 |
| Pacific Ocean | 85 | 316219.8714 | 3770263.5227 | 17.6 | 18.6 | 19.3 | 20.0 | 21.8 |
| Pacific Ocean | 86 | 318077.3711 | 3769274.0506 | 15.1 | 16.6 | 18.0 | 19.6 | 24.6 |
| Pacific Ocean | 87 | 318672.6792 | 3768887.8515 | 15.3 | 16.3 | 17.0 | 17.8 | 19.9 |

**Table 17: Coastal Transect Parameters, continued**

| Flood Source | Coastal Transect | X, Y Coordinates (Meters, NAD83 UTM Zone 10) | | Total Water Level (feet NAVD88)[1] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Pacific Ocean | 88 | 318795.6917 | 3768823.0153 | 26.3 | 29.0 | 31.2 | 33.6 | 40.0 |
| Pacific Ocean | 89 | 319328.3756 | 3768588.5694 | 13.1 | 15.1 | 17.2 | 20.2 | 31.5 |
| Pacific Ocean | 90 | 319726.2393 | 3768459.8649 | 16.8 | 17.7 | 18.4 | 19.0 | 20.6 |

**Figure 9: Transect Location Map**

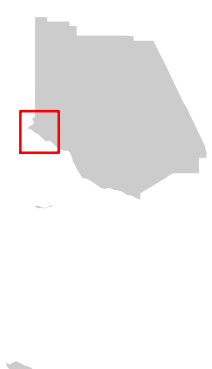



1 inch = 4,583 feet 1:55,000

Feet
0 1,300 2,600 5,200 7,800 10,400

Map Projection:
Universal Transeverse Mercator Zone 11 North;
North American Datum 1983

COUNTY LOCATOR



## NATIONAL FLOOD INSURANCE PROGRAM

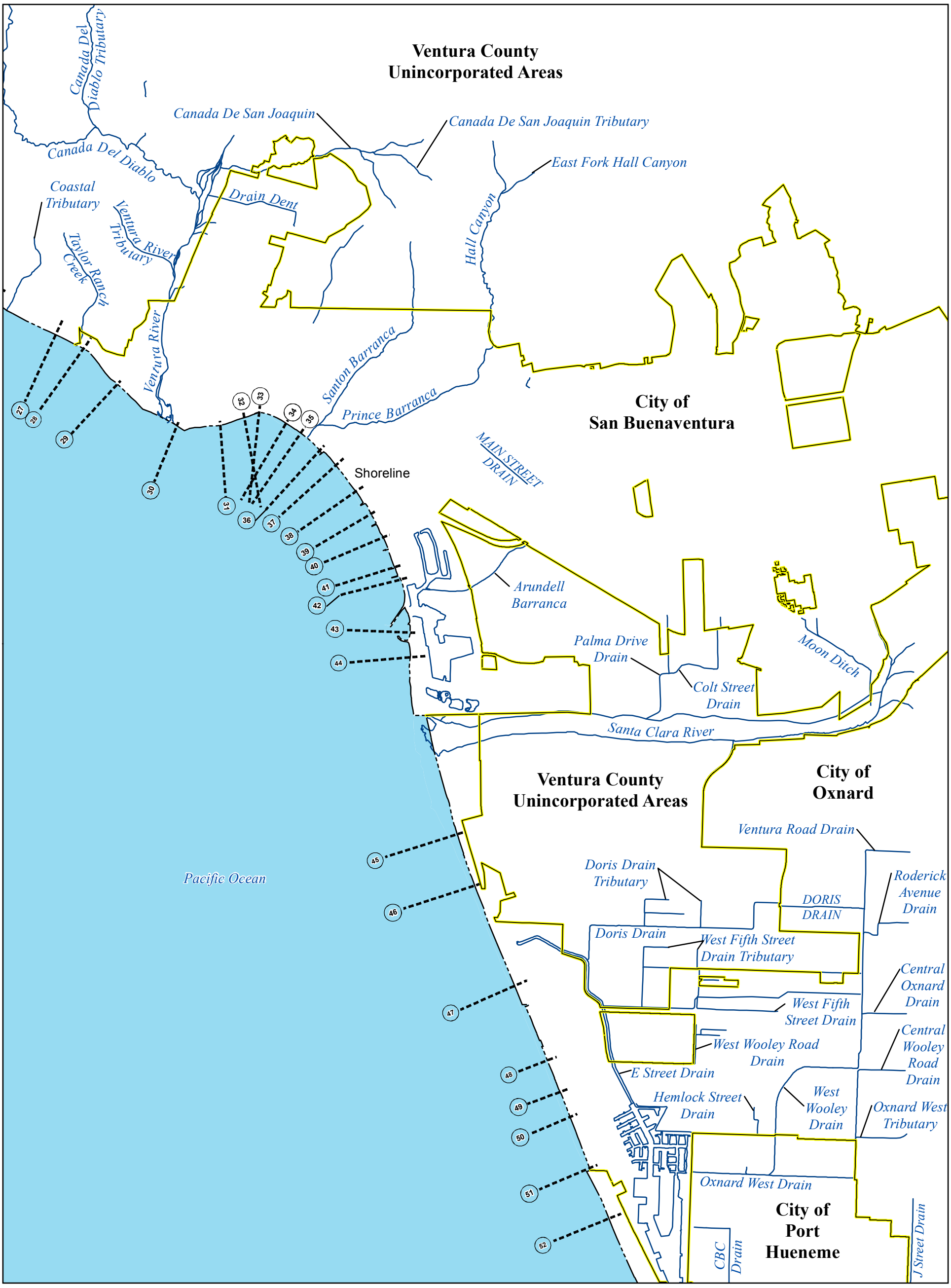
Transect Location Map 1

**PANELS WITH TRANSECTS**

0539F, 0701F, 0702F, 0706F, 0708F, 0709F, 0728F, 0736F, 0737F, 0739F

FEMA

**Figure 9: Transect Location Map, continued**

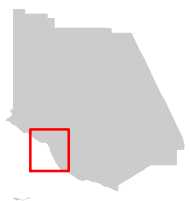



1 inch = 4,583 feet 1:55,000

Feet
0 1,300 2,600 5,200 7,800 10,400

Map Projection:
Universal Transeverse Mercator Zone 11 North;
North American Datum 1983

COUNTY LOCATOR



## NATIONAL FLOOD INSURANCE PROGRAM

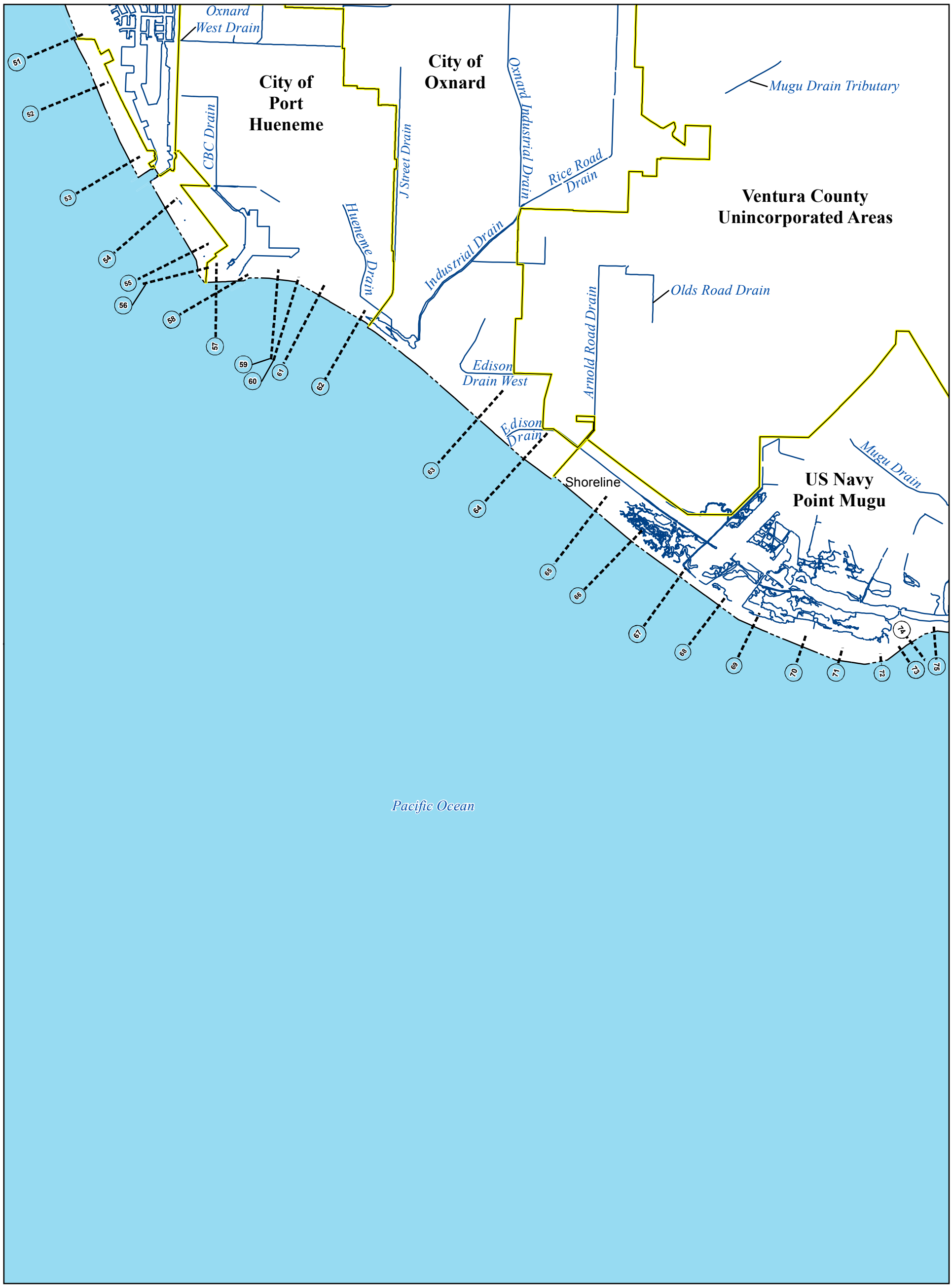
Transect Location Map 1

**PANELS WITH TRANSECTS**

0737F, 0739F, 0743F, 0744F, 0882F, 0884F, 0903F, 0911F

FEMA

**Figure 9: Transect Location Map, continued**




1 inch = 4,583 feet 1:55,000

Feet
0 1,300 2,600 5,200 7,800 10,400

Map Projection:
Universal Transeverse Mercator Zone 11 North;
North American Datum 1983

COUNTY LOCATOR

## NATIONAL FLOOD INSURANCE PROGRAM

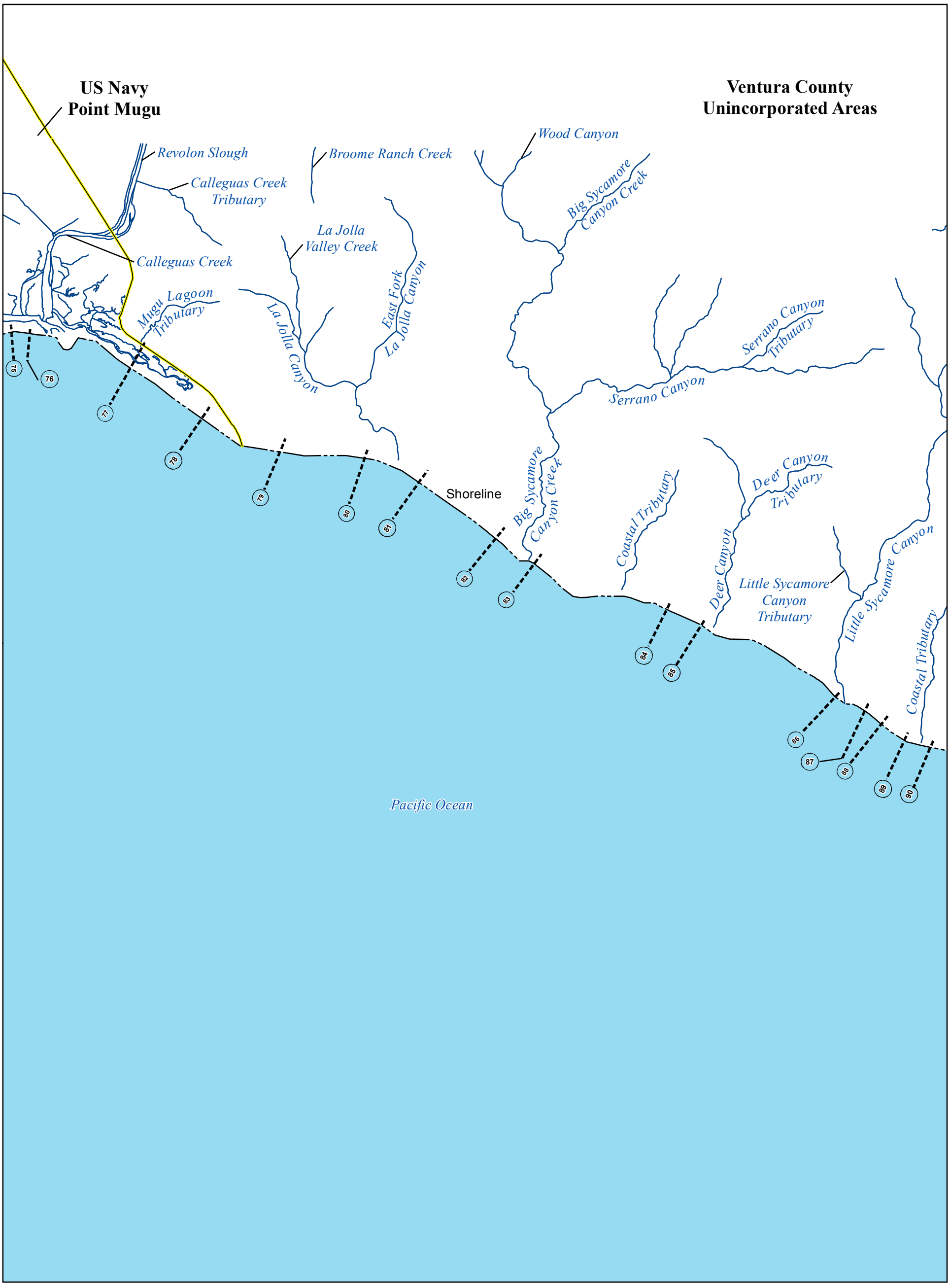
Transect Location Map 1

**PANELS WITH TRANSECTS**

0911F, 0913F, 0914F, 0918F, 1081F, 1082F, 1101F

FEMA

**Figure 9: Transect Location Map, continued**




1 inch = 4,583 feet 1:55,000

0 1,300 2,600 5,200 7,800 10,400 Feet

Map Projection:

Universal Transeverse Mercator Zone 11 North;
North American Datum 1983

COUNTY LOCATOR

## NATIONAL FLOOD INSURANCE PROGRAM

Transect Location Map 1

**PANELS WITH TRANSECTS**

1101F, 1102F, 1104F, 11088F, 1109F, 1128F, 1136F, 1137F

FEMA

## 5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk project.

**Table 18: Summary of Alluvial Fan Analyses**
**[Not Applicable to this Flood Risk Project]**

**Table 19: Results of Alluvial Fan Analyses**
**[Not Applicable to this Flood Risk Project]**

## SECTION 6.0 – MAPPING METHODS

### 6.1 Vertical and Horizontal Control

All FIS Reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS Reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey (NGS) at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the archived project documentation associated with the FIS Report and the FIRMs for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks in the area, please contact information services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

A countywide conversion factor of 2.58 feet was calculated for Ventura County.

**Table 20: Countywide Vertical Datum Conversion**

**[Not Applicable to this Flood Risk Project]**

**Table 21: Stream-Based Vertical Datum Conversion**

**[Not Applicable to this Flood Risk Project]**

## 6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA's *Guidelines and Standards for Flood Risk Analysis and Mapping*, www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping.

Base map information shown on the FIRM was derived from the sources described in Table 22.

**Table 22: Base Map Sources**

| Data Type | Data Provider | Data Date | Data Scale | Data Description |
|---|---|---|---|---|
| Digital Orthophoto | Coastal Service Center | 2011 | * | LiDAR and Digital Imagery |
| Digital Orthophoto | U.S. Department of Agriculture Farm Service Agency | 2012 | * | Digital Imagery |
| Digital Orthophoto | USGS | 1994 | * | Digital Orthophoto Quadrangles |
| Public Land Survey System (PLSS) | Federal Emergency Management | 2007 | * | PLSS data was supplied in digital format |
| Transportation Features | U.S. Census Bureau | * | * | TIGER/Line shapefile of Ventura County, CA |
| Surface Water Features | Federal Emergency Management Agency | 2015 | * | Streams, rivers, and lakes were derived from NFHL data |

*Data not available

## 6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 23. For each coastal flooding source studied as part of this FIS Report, the mapped floodplain boundaries on the FIRM have been delineated using the inland extent of the 1% annual chance TWL, inland extent of wave overtopping, or PFD boundary determined at each transect; between transects,

boundaries were delineated using land use and land cover data, the topographic elevation data described in Table 23, and knowledge of coastal flood processes. In ponding areas, flood elevations were determined at each junction of the model; between junctions, boundaries were interpolated using the topographic elevation data described in Table 23.

In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

The floodway widths presented in this FIS Report and on the FIRM were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 24, "Floodway Data."

**Table 23: Summary of Topographic Elevation Data used in Mapping**

| Community | Flooding Source | Source for Topographic Elevation Data | | | | | |
|---|---|---|---|---|---|---|---|
| | | Description | Scale | Contour Interval | $RMSE_z$ | $Accuracy_z$ | Citation |
| Camarillo, City of; Simi Valley, City of; Ventura County, Unincorporated Areas | All flooding sources | Topographic Maps | 1:2,400 | 2 ft<br>5 ft | N/A | N/A | VCDPW 1967-1979 |
| Fillmore, City of | All flooding sources | Topographic Maps | 1:1,200 | 2 ft<br>5 ft | N/A | N/A | VCDPW, 1965, et cetera |
| Ojai, City of | All flooding sources | Topographic Maps | 1:2,400 | 2 ft | N/A | N/A | VCFCD & VCSMD, 1977 |
| Oxnard, City of | All flooding sources | Topographic Maps | 1:2,400 | 2 ft<br>5 ft | N/A | N/A | VCDPW, 1970 |
| Oxnard, City of; Port Hueneme, City of; San Buenaventura, City of; Ventura County, Unincorporated Areas | Pacific Ocean | LiDAR OPC/ USGS 2009-2011 & BATHY NOAA | N/A | 2 ft | N/A | N/A | USGS, 2009-2011 |
| Santa Paula, City of | Santa Paula Creek | Topographic Maps | 1:2,400 | 2 ft | N/A | N/A | USACE, June 1977 |

**Table 23: Summary of Topographic Elevation Data used in Mapping, continued**

| Community | Flooding Source | Source for Topographic Elevation Data | | | | | |
|---|---|---|---|---|---|---|---|
| | | Description | Scale | Contour Interval | $RMSE_z$ | $Accuracy_z$ | Citation |
| Simi Valley, City of | All flooding sources | Photo Maps | 1:1,200 | N/A | N/A | N/A | City of Simi Valley, 1987 |
| Ventura County, Unincorporated Areas | All flooding sources | Topographic Maps | 1:6,000 | 20 ft | N/A | N/A | VCDPW, 1967 |
| Ventura County, Unincorporated Areas | Rincon Creek | Topographic Maps | 1:4,800 | 4 ft | N/A | N/A | Aerial Topographic Maps 1987 |

BFEs shown at cross sections on the FIRM represent the 1% annual chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations.